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Pinellas Environmental Restoration Project
Sitewide Environmental Monitoring
Quarterly Progress Report
for the
Young-Rainey STAR Center

January through March 2002

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Prepared by
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Acronyms and Abbreviations

AST	air stripper tower
BTEX	benzene, toluene, ethylbenzene, and xylene
°C	degrees Celsius
CMS	Corrective Measures Study
CMIP	Corrective Measures Implementation Plan
DCA	dichloroethane
DCE	dichloroethene
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
ft	feet
ft/ft	feet per foot
HSWA	Hazardous and Solid Waste Amendments
ICM	interim corrective measures
ICMS	Interim Corrective Measures Study
IMW	Interim Measures Work (Plan)
ITRD	Innovative Treatment Remediation Demonstration
IWNF	Industrial Wastewater Neutralization Facility
MACTEC–ERS	MACTEC Environmental Restoration Services, LLC
MCL	maximum contaminant level
MSL	mean sea level
µmhos/cm	micromhos per centimeter
µg/L	micrograms per liter
mg/L	milligrams per liter
mV	millivolt
NAPL	non-aqueous phase liquid
NELAC	National Environmental Laboratory Accreditation Conference
NTU	Nephelometric Turbidity Units
PCIC	Pinellas County Industrial Council
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RPD	relative percent difference
SDWA	Safe Drinking Water Act
STAR	Science, Technology, and Research
STL	Severn Trent Laboratories
SWMU	solid-waste management unit
TCE	trichloroethene
TVOCs	total volatile organic compounds
VEA	vertical electrode array
VOCs	volatile organic compounds
WWNA	Wastewater Neutralization Area

1.0 Introduction

The Young-Rainey Science, Technology, and Research Center (STAR Center) is a former U.S. Department of Energy (DOE) facility constructed in the mid-1950s in Pinellas County, Florida. The 99-acre STAR Center is located in Largo, Florida, and lies in the northeast quarter of Section 13, Township 30 South, Range 15 East (Figure 1). The STAR Center, while owned by DOE, primarily manufactured neutron generators for nuclear weapons. Other products manufactured at the STAR Center have included radioisotopically powered thermoelectric generators, thermal batteries, specialty capacitors, crystal resonators, neutron detectors, lightning-arrestor connectors, and vacuum-switch tubes. In 1987, the U.S. Environmental Protection Agency (EPA) performed a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) at the site to gather information on potential releases of hazardous materials. In February of 1990, EPA issued a Hazardous and Solid Waste Amendment (HSWA) permit to DOE, enabling DOE to investigate and perform remediation activities in those areas contaminated by hazardous materials resulting from DOE operations. On March 17, 1995, DOE sold the facility to the Pinellas County Industrial Council (PCIC). The sales contract included clauses to ensure continued compliance with Federal, State, and local regulations while DOE remediates the site. On July 1, 1999, the PCIC was disestablished and ownership of the STAR Center changed to the Pinellas County government. In November 2000, the State of Florida received HSWA authorization from the EPA. The Florida Department of Environmental Protection (FDEP) issued a new HSWA Permit to DOE in January 2002.

Administration of DOE activities at the facility is the responsibility of the DOE Idaho Operations Office. Responsibility for environmental restoration activities, conducted under the EPA RCRA Corrective Action Program of 1984, was transferred from DOE's Pinellas Area Office to DOE's Grand Junction Office in October 1997. MACTEC Environmental Restoration Services, LLC (MACTEC−ERS), a prime contractor to the DOE Grand Junction Office, provides technical support to DOE for remediation and closure of all active solid-waste management units (SWMUs) on site.

Groundwater monitoring and remediation are also ongoing at the 4.5 Acre Site. The 4.5 Acre Site is a parcel of land that was originally part of the DOE facility but was sold to a private individual. In 1984, groundwater contamination was discovered at this site. Currently, DOE leases the site from the land owner and is actively pursuing groundwater cleanup. The 4.5 Acre Site is under purview of Florida State regulations enforced by the FDEP. A summary of remediation activities can be found in the *Interim Remedial Action Quarterly Progress Report for the 4.5 Acre Site.*

The EPA RFA Report and the HSWA permit identified 15 sites at the former DOE facility that may have experienced environmental contamination as a result of past activities. Upon completion of the RCRA Facility Investigation, 11 of the 15 SWMUs were recommended by DOE and approved by EPA Region IV and the FDEP for no further action (DOE 1994). A twelfth site, the Former Pistol Range Site, was remediated in 1993 and recommended by DOE and approved by EPA Region IV and the FDEP for no further action.

Two additional SWMUs, the West Fenceline Site and the Wastewater Neutralization Area/ Building 200 (WWNA/Building 200), were identified after the HSWA permit was issued, bringing the total to 17 SWMUs that have been identified and investigated at the STAR Center. Remediation of the West Fenceline Site was completed in 1997 and DOE recommended, and

EPA Region IV and FDEP approved, no further action. A Corrective Measures Study (CMS)/Corrective Measures Implementation Plan (CMIP) was prepared and submitted in 1997 to EPA Region IV and FDEP to address the contamination at the WWNA/Building 200 Area.

Therefore, there are currently four sites that have contamination in the surficial aquifer groundwater at levels in excess of protective standards. These four SWMUs, the Old Drum Storage Site (PIN06), the Industrial Drain Leaks-Building 100 Area (PIN12), the Northeast Site (PIN15), and the WWNA/Building 200 Area (PIN18), have been recommended for or are undergoing remediation activities. Two SWMUs, PIN06 and PIN12, are currently being remediated together because of their similar groundwater contamination and proximity. These two SWMUs are collectively known as the Building 100 Area. Figure 2 depicts the location of the four SWMUs.

Additional background information relative to each SWMU is briefly described below. This document also serves as the quarterly progress report for each of these four SWMUs. The results of monitoring activities, a summary of the treatment system performance, and a summary of ongoing and projected work are provided in this report.

1.1 Building 100 Area

The Building 100 Area (PIN06 and PIN12) is located in the southeast portion of the STAR Center. The Old Drum Storage Site is the former location of a concrete storage pad equipped with a drain and containment system used to store hazardous waste including dichloromethane (also known as methylene chloride), ignitable liquids, arsenic, and calcium chromate solids (DOE 1987a). Empty drums containing residual waste solvents were also stored in this area (DOE 1987b). The concrete pad was located near the northwest corner of Building 100. The pad was removed in October 1983 in accordance with an FDEP closure permit (DOE 1987a), and a closure report was submitted to the FDEP in August 1986 (DOE 1986). The decommissioning of the pad and the cessation of drum storage effectively removed the potential for a future contaminant source at PIN06.

Building 100 is the largest building on site and covers approximately 11 acres. In the past, offices, laboratories, and production facilities for the DOE were housed in the building. SWMU PIN12 consists of the liquid waste drainage system serving Building 100. Four individual drainage systems (sanitary, chemical, health physics, and storm water) were present within the building. In 1989, all four drainage systems were investigated, including verifying the system routing and the condition of underground and above-ground piping and ancillary equipment (EMC 1989). As a result of this investigation, the health physics and chemical drainage systems were flushed, grouted, and abandoned (DOE 1997). Some of the chemical drain lines were replaced by an above-ground system currently used by tenants of the building.

A CMS and CMIP were completed and approved for the Building 100 Area because volatile organic compounds (VOCs) concentrations measured in groundwater at the Old Drum Storage Site (PIN06) and one monitoring well located at the northwest corner of Building 100 (PIN12) exceeded the Safe Drinking Water Act (SDWA) and FDEP maximum contaminant levels (MCLs). Subsequent investigations revealed elevated VOCs concentrations under Building 100 and downgradient to the southeast as well. On August 15, 2000, the EPA approved the Building 100 CMIP Addendum. The FDEP approved this same document on November 15, 1999.

Commencing in May 2001, DOE began an analysis of the potential remediation strategies for Building 100 including the need for a containment barrier to retard the potential of offsite migration of contaminants, source treatment and dissolved phase treatment. The *Building 100 Area Remediation Technology Screening Report* (DOE 2001) was prepared and assembled a list of remediation technologies, categorized them into the remediation tasks, and conducted an initial screening of the technologies. This initial screening simply eliminates the technologies that obviously will not work and recommends technologies that should be retained for detailed evaluation at a later time. The final technology for each task will be identified at a later date.

The *Building 100 Area Plume Control Technology Selection Report* was prepared in February 2002 that conducted a detailed evaluation of five plume control technologies and recommended a technology that should be implemented for plume control at the Building 100 Area. Based on this evaluation, enhanced bioremediation was recommended to control the contaminant plume.

Currently, a request for proposal is being prepared that will be the basis for choosing the exact approach for implementation of enhanced bioremediation for plume control.

1.2 Northeast Site Area

In the late 1960s, before construction of the East Pond, drums of waste and construction debris were disposed of in the swampy area of the Northeast Site. The East Pond was excavated in 1968 as a borrow pit. In 1986, an expansion of the East Pond was initiated to create additional storm-water retention capacity. Excavation activities ceased when contamination was detected directly west of the East Pond. EPA identified the Northeast Site as a SWMU. An Interim Corrective Measures Study was developed and submitted to EPA and approval of this document was received in October 1991. An interim groundwater recovery system for the Northeast Site was installed, and operation commenced in January 1992. The implementation of this interim corrective measures (ICM) system at this site is consistent with the regulatory goals of the EPA's RCRA Corrective Actions (Subpart S).

The ICM system, as initially installed, consisted of four recovery wells equipped with pneumatic recovery pumps, a holding tank, centrifugal transfer pumps, and approximately 2,500 feet (ft) of transfer and secondary containment piping. During 1993, DOE proposed a reconfigured system for the site consisting of four shallow and three deep recovery wells. After EPA approved the system upgrade, the system was reconfigured and became operational on March 1, 1994.

Between August and October 1995, after EPA and FDEP approval, a portion of the Northeast Site was excavated to remove debris and other materials that could inhibit future corrective measures. Location of the areas of excavation was based primarily on the results of a geophysical survey and knowledge of existing utility locations. Detailed descriptions of the debris removal activities were submitted to EPA and FDEP as part of the *Northeast Site Interim Measures Quarterly Progress Report* (DOE 1996).

In 1996, DOE submitted a CMIP to EPA Region IV and FDEP. This plan was approved by both regulatory agencies in 1997. As part of the Northeast Site CMS and CMIP, a pump-and-treat system in conjunction with a subsurface hydrogeologic barrier wall to prevent migration of the contaminant plume was identified as the best available technology. A pretreatment system for iron removal, an air stripper unit, and a tank for holding treated groundwater before discharge to the Pinellas County Publicly Owned Treatment Works were recommended. The treatment system was constructed in early 1997 and became operational by July 1997 with seven Northeast Site recovery wells and two Building 100 recovery wells pumping to the system influent tank. Subsequently, several additional recovery wells were installed, and some of the old recovery wells were abandoned.

During 1997, anaerobic bioremediation and rotary steam stripping pilot tests were conducted in the northern and southern portions of the Northeast site, respectively. These tests were designed by an Innovative Treatment Remediation Demonstration group of regulatory and industry members to provide remedial options at the STAR Center. At the conclusion of the field tests in July 1997, pump-and-treat technology resumed at the Northeast Site.

A technical and cost evaluation of four vendor responses to the In-Situ Thermal Remediation of Non-Aqueous Phase Liquid (NAPL) at the Northeast Site Request for Proposal was conducted during the later part of February and most of March 2001. The responses covered a conceptual design, life cycle schedule, and costs to implement. A vendor was contracted on July 6, 2001. A Conceptual Design was provided on September 14, 2001.

An *Interim Measures Work (IMW) Plan for Remediaiton of Non-Aqueous Phase Liquids at the Northeast Site* was submitted to the FDEP in late November 2001. The purpose of this document was to present the plan for the interim measure to remediate NAPLs at the Northeast Site. An interim corrective measure is warranted because it supports the long term corrective action to remediate the dissolved phase contamination in the surficial aquifer to FDEP drinking water MCLs. Without this measure, NAPLs will continue to act as a source of dissolved contamination, resulting in contaminant concentrations in groundwater well above the MCLs. The FDEP approved this document on January 10, 2002.

Concurrent with the preparation of the IMW Plan, an Environmental Checklist recommending a Categorical Exclusion was prepared and approved by DOE on December 19, 2001. The Categorical Exclusion pathway was approved based upon the fact that the NAPL remediation of Area A is a small-scale, short-term cleanup action and the siting, construction, and operation of treatment facilities are temporary and pilot-scale in size.

1.3 WWNA/Building 200 Area

The WWNA/Building 200 Area includes the active Industrial Wastewater Neutralization Facility (IWNF), the area around Building 200, and the area south of the neutralization facility. The IWNF refers to the physical treatment facility that currently receives sanitary and industrial wastewater and has been in operation since 1957.

A CMS Report and CMIP were completed in 1997 for this SWMU because vinyl chloride, trichloroethene (TCE), and arsenic were detected in surficial aquifer groundwater above Federal and State MCLs. The recommended remediation alternative for the WWNA/Building 200 Area was groundwater recovery with the Building 100 Area wells and an additional recovery well located in the WWNA. The CMIP recommended that recovered water from the additional well be discharged directly to the IWNF and that the recovery well in the WWNA/Building 200 Area will withdraw surficial aquifer groundwater directly from the arsenic plume and thereby reduce the contaminant mass and prevent contaminant migration.

The FDEP response to the CMS/CMIP concerning arsenic soil contamination in the upper 2 ft suggested that a treatment technology, air sparging, was eliminated too early. DOE then proposed a multi-phased Interim Action that included operating the recovery well for 6 months, then pulsing the system, as well as performing geochemical analyses and leaching studies of the site. On January 21, 1999, FDEP approved the proposed interim remedial action.

Additionally, EPA Region IV also approved the interim remedial action and concurred with the FDEP's position regarding the arsenic contamination. The EPA also requested an addendum or modification to the CMIP that addresses DOE's final selection of the remediation technology and a timeline for the completion of these activities.

In early June 1999, the WWNA recovery well commenced operation. All arsenic concentrations from the WWNA recovery well, PIN18–RW01, were below the STAR Center's daily maximum discharge standard for arsenic in wastewater of 0.20 milligrams per liter (mg/L) until shutdown.

Additional details concerning the impacts of groundwater extraction are reported in the WWNA/Building 200 Area CMIP Addendum (DOE 2000e). Modifications to the recovery of groundwater were proposed based on data collected through November 1999 and consisted of the installation of two new recovery wells screened at shallow intervals. The CMIP Addendum was submitted to the regulators and approved by FDEP and EPA. A Statement of Basis (DOE 2000d) was issued by DOE in late September 2000. This document provides a summary of environmental investigations and proposed cleanup alternatives for the WWNA/Building 200 Area. Current activities at the WWNA include groundwater extraction from two recovery wells, PIN18–RW02 and –RW03, and discharge to the STAR Center's wastewater system. Table 1 depicts the results of the analysis of arsenic in groundwater that is being recovered from these two wells.

1.4 Site Update

Work continued on the preparation of the final design for the NAPL remediation at the Northeast Site. NAPL remediation project plans including the Health and Safety Plan, Environmental Compliance and Waste Management Plan, Quality Assurance and Quality Control Plan, and the Monitoring Plan are also being prepared to support NAPL remediation activities.

The *Management Plan for the NAPL Remediation Project at the Northeast Site* was prepared in March 2002 that describes the NAPL remediation project and the responsibilities, authorities, and actions of the participants in the project. The primary participants in the project are the DOE, MACTEC–ERS, the MACTEC–ERS subcontractor SteamTech Environmental Services, and regulatory agencies. The plan also includes descriptions of the roles and responsibilities for phases and aspects of the project, such as design, construction, operation and maintenance, verification, compliance, and waste management.

To better define the extent of the plume downgradient of Building 100, in late March 2002, groundwater samples were collected from 14 locations from two depths up to 40 ft below land surface using direct push technology. The results of this investigation will be presented in the next quarterly report.

1.5 Quarterly Site Activities

MACTEC–ERS personnel conducted the following tasks at the STAR Center to fulfill the requirements of the scope of work for quarterly sampling:

- Obtained water-level measurements from all accessible monitoring wells, recovery wells, and ponds on January 7, 2002.

- Conducted the quarterly sampling event in January 2002. This included collecting water samples from 128 monitoring and recovery wells. Sampling included collecting 118 samples for analysis of VOCs, sampling 78 wells in the Building 100 area for RCRA metals and mercury, and sampling 10 wells at the WWNA for arsenic. Additionally, seven filtered samples were collected from Building 100 locations for RCRA metals and mercury analysis and 8 samples from the Northeast Site were collected for Florida Petroleum Range Organic (Fl-PRO) analysis.

- Reported the results of quarterly sampling events (this document).

2.0 Water-Level Elevations

2.1 Work Conducted and Methods

Within an 9-hour period on January 7, 2002, depth-to-water measurements were taken at all accessible monitoring wells, test wells, and extraction wells at the STAR Center. The water levels were measured with an electronic water-level indicator. Groundwater and surface-water elevations are listed in Table 2.

2.2 Groundwater Flow

Groundwater and surface-water elevations were used to construct sitewide groundwater contour maps of the shallow and deep surficial aquifers (Plates 1 and 2, respectively). Individual contour maps were also constructed for the shallow and deep surficial aquifers at the Northeast Site and the Building 100 Area (Figure 3 through Figure 6, respectively). All data points except the water level from sampling point PIN12–S55D were honored when constructing the interpretive contours. The water level from PIN12–S55D was about 4 ft lower than in the other deep wells at the Building 100 Area, and is thus suspected to have been measured incorrectly.

The water levels throughout the STAR Center indicate that the water table is highest in the area between the 4.5 Acre Site and the WWNA (Plates 1 and 2). As groundwater flows from this recharge area, it disperses in a radial pattern to the north, east, and southeast across the STAR Center. These flow patterns are similar for both the shallow and deep surficial aquifers.

At the Northeast Site, groundwater flow patterns, especially in the deep surficial aquifer, are greatly affected by withdrawals from 11 active recovery wells. The cones of depression resulting from the pumping of these recovery wells are particularly evident on Figure 4. The overall influence of the recovery wells in the deep surficial aquifer extends to the periphery of the Northeast Site in all directions.

Along the northern boundary of the Northeast Site, the contours near the slurry wall indicate that the wall continues to be a significant barrier to groundwater flow. As seen on Figure 4, there is a differential of more than 3 ft between the downgradient and upgradient side of the wall as measured in monitoring wells PIN15–M24D and –M33D. This differential is similar to that observed in previous quarters and continues to suggest that only a minimal amount of groundwater recharge to the deep surficial aquifer is derived from the pond. Otherwise, the differential between these two wells would be smaller and the groundwater gradient would be steeper near the pond, indicating recharge to the groundwater system. The flow patterns of the water table immediately west of the East Pond, however, indicates that the pond is recharging the shallow surficial aquifer (Figure 3).

In the shallow surficial aquifer just south of the Northeast Site, the hydraulic gradient was approximately 0.009 feet per foot (ft/ft). Using Darcy's Law, along with approximations of 1 ft/day for hydraulic conductivity and 0.3 for effective porosity, groundwater in the southern part of the site is estimated to move about 11 ft/year toward the north (i.e., toward the on-site extraction wells) under conditions influenced by pumping. In the deep surficial aquifer, the radius of influence from the recovery wells is interpreted to extend just south of monitoring well PIN15–0558 (Figure 4).

In the south-central part of the STAR Center, deep surficial aquifer flow is influenced by groundwater withdrawals from recovery well PIN12–RW02 in the northwest corner of Building 100 (Figure 6). In addition, shallow surficial aquifer flow is influenced by withdrawals from recovery well PIN18–RW03 at the WWNA. Shallow groundwater beneath Building 100 flows out laterally to the north, east, and south. Surficial groundwater at the WWNA flows to the southeast, except where affected by recovery well withdrawals. The hydraulic gradient beyond the influence of pumping at the Building 100 and WWNA Areas was approximately 0.002 ft/ft. Using the approximations mentioned above, groundwater flow velocity in these areas is estimated to be about 2 ft/year, which is consistent with the velocity estimated in October 2001.

Water-level elevations in the three wells screened in the upper part of the Floridan aquifer are presented in Table 3. The relative elevations in these wells are consistent with the regional groundwater flow direction, towards the northeast and Tampa Bay, for the Floridan aquifer.

A downward vertical hydraulic differential of approximately 5.9 ft existed between the surficial aquifer wells and Floridan aquifer wells at the Northeast Site. Table 4 illustrates the vertical hydraulic differential. This differential is consistent with the historical range of 5 to 9 ft.

Surface-water elevations were recorded from the East, South, Southwest, and West Ponds at the site and are presented in Table 5. The ponds are hydraulically connected to the shallow surficial aquifer system. A water level was obtained from the West Pond by directly reading a new staff gauge that was installed in the pond in December 2001. The South Pond elevation of 13.54 ft was below both the drain holes in the vertical concrete containment around the pond. The South and Southwest Pond elevations were essentially the same.

3.0 Groundwater Sampling and Analytical Results

3.1 Work Performed and Methods

During quarterly sampling in January 2002, groundwater samples were collected from 128 monitoring and recovery wells. There were 118 samples analyzed for VOCs using EPA Method 8021. Seventy-eight unfiltered groundwater samples and seven filtered samples were analyzed for RCRA metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Mercury was analyzed using EPA Method 7470, the other metals were analyzed using EPA Method 6010. Ten additional samples were analyzed for arsenic using EPA Method 6010. At the Northeast Site, eight samples were collected for FI-PRO analysis. Laboratory reports are provided in Appendix A.

During the period of January 1 to March 31, 2001, the remediation system influent and effluent at the Northeast Site, as well as selected recovery wells at the Northeast Site, were also sampled. Analytical results for remediation system VOCs, iron, and hardness (as $CaCO_3$) sampling are provided in Appendix B.

All samples were collected in accordance with the MACTEC–ERS *Sampling and Analysis Plan for the Young - Rainey STAR Center*, using FDEP procedures. All samples collected were submitted to Severn Trent Laboratories (STL) for analysis. STL is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference (NELAC), certification number E84282. The majority of monitoring wells were micropurged using a dedicated bladder pump, and sampling was performed when the field measurements stabililized. The remaining wells were conventionally purged with a peristaltic pump or a 2-inch diameter stainless-steel submersible pump; purging was considered complete when five well volumes were purged and one set of field measurements had stabilized. Extraction wells were sampled using their associated flowlines with dedicated sampling ports. Table 6 lists field measurements of pH, specific conductance, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature recorded at the time the sample was collected. Measurements were made with a flow cell and a multiparameter instrument.

3.2 Analytical Results

3.2.1 Northeast Site (PIN15)

Volatile organic compounds (VOCs), benzene, toluene, ethylbenzene, and xylene (BTEX) concentrations in samples collected from wells at the Northeast Site (PIN15) are included in Table 7 and Table 8, respectively. Table 9 provides data on additional VOCs detected that are not included in Table 7 and Table 8. Figure 7 shows the total VOC (TVOC) concentrations and includes BTEX compounds.

No VOCs were detected in the 12 monitoring wells listed below:

PIN15–0515	PIN15–0562	PIN15–M18S
PIN15–0516	PIN15–0563	PIN15–M27S
PIN15–0530	PIN15–0564	PIN15–M29S
PIN15–0561	PIN15–M18D	PIN15–M32D

The 28 monitoring and recovery wells listed below contained detectable VOCs:

PIN15–0514	PIN15–0559	PIN15–M27D	PIN15–RW06	PIN15–RW14
PIN15–0535	PIN15–0560	PIN15–M29D	PIN15–RW08	PIN15–RW15
PIN15–0536	PIN15–0565	PIN15–M31D	PIN15–RW09	PIN15–RW16
PIN15–0537	PIN15–0566	PIN15–M31S	PIN15–RW11	PIN15–RW17
PIN15–0538	PIN15–0567	PIN15–M32S	PIN15–RW12	
PIN15–0558	PIN15–DRW5	PIN15–M34D	PIN15–RW13	

TVOCs concentrations ranged from below detection limit to 718,000 micrograms per liter (µg/L) in well PIN15–RW06. The compound detected at the highest concentration in PIN15–RW06 was methylene chloride at a concentration of 520,000 µg/L.

3.2.2 Building 100 Area (PIN12)

VOCs concentrations in samples collected from wells sampled at the Building 100 Area (PIN12) are included in Table 7. BTEX compounds were detected and are shown in Table 8. Table 9 provides data on additional VOCs detected that are not included in Table 7. Figure 8 shows the TVOCs concentrations. Table 10 lists the metals concentrations.

No VOCs were detected in the 23 monitoring wells listed below:

PIN12–0508	PIN12–0518	PIN12–S59D	PIN12–S62D	PIN12–S66B
PIN12–0511	PIN12–0522	PIN12–S60C	PIN12–S64D	PIN12–S66D
PIN12–0512	PIN12–S36B	PIN12–S60D	PIN12–S65B	PIN12–TE03
PIN12–0515	PIN12–S56B	PIN12–S61B	PIN12–S65C	
PIN12–0517	PIN12–S56C	PIN12–S62B	PIN12–S65D	

Samples from the 42 monitoring wells listed below contained VOCs at detectable levels. They are:

PIN12–0509	PIN12–0525	PIN12–S35B	PIN12–S59B	PIN12–S64B
PIN12–0510	PIN12–0526	PIN12–S37B	PIN12–S59C	PIN12–S64C
PIN12–0513	PIN12–RW01	PIN12–S54D	PIN12–S60B	PIN12–S66C
PIN12–0514	PIN12–RW02	PIN12–S55B	PIN12–S61C	PIN12–S67B
PIN12–0516	PIN12–S29C	PIN12–S55C	PIN12–S61D	PIN12–S67C
PIN12–0520	PIN12–S30B	PIN12–S56D	PIN12–S62C	PIN12–S67D
PIN12–0521	PIN12–S31B	PIN12–S57B	PIN12–S63B	
PIN12–0523	PIN12–S32B	PIN12–S57C	PIN12–S63C	
PIN12–0524	PIN12–S33C	PIN12–S57D	PIN12–S63D	

TVOCs concentrations ranged from below detection limits to 148,500 µg/L in well PIN12–S35B. The compound detected at the highest concentration in PIN12–S35B was cis-1,2-DCE at a concentration of 76,000 µg/L.

No Floridan aquifer wells were sampled for VOCs this quarter.

3.2.3 Wastewater Neutralization Area (PIN18)

Samples were collected from the 2 wells listed below for VOC analysis; no VOCs were detected.

PIN18–RW02
PIN18–RW03

Arsenic samples were collected from 10 wells. Arsenic concentrations are listed in Table 11 and shown in Figure 9. The highest concentration of arsenic detected was 0.54 mg/L in PIN18–0501.

3.2.4 Perimeter and Other Monitoring Wells (PIN21, PIN06, PIN09, and PIN10)

Concentrations of VOCs compounds measured in 11 samples from perimeter monitoring wells are included in Table 7. No BTEX compounds were detected. Table 9 provides data on additional VOCs detected that are not included in Table 7. Figure 8 shows the TVOCs concentrations for the PIN21 wells.

No VOCs were detected in the six monitoring wells listed below:

PIN21–0500	PIN21–0502	PIN21–0504
PIN10–0500	PIN21–0503	PIN21–0505

Samples from the five monitoring wells listed below contained VOCs at detectable levels. They are:

PIN09–0500	PIN21–0501	PIN21–0512
PIN06–0500	PIN06–0501	

The sample from PIN21–0512 contained TVOCs at 11.4 µg/L. The compound detected at the highest concentration in PIN21–0512 was vinyl chloride at a concentration of 8.6 µg/L.

3.3 Quality Assurance/Quality Control

MACTEC–ERS checked the analytical results from STL for quality assurance/quality control (QA/QC) through duplicate samples, trip blanks and equipment blanks. Detected analytes for VOCs, metals and arsenic analyses for each duplicate sample are listed in Table A–1 (Appendix A). The duplicate sample results were compared and the relative percent differences (RPDs) between the results were calculated. There were nine duplicate locations and 11 duplicate samples collected. A total of 264 duplicate analyses were performed. Three of the analyses failed. Two sample/duplicate pairs, PIN12–S33C and PIN12–S66B had some analytes that did not meet the guidance criterion that the RPDs results should be within the range of ±30 percent when the concentration is greater than 5 times the detection limit. The failure rate was approximately 1.0 percent. All other data passed QA/QC criteria at a Class A level, indicating that all data may be used for quantitative and qualitative purposes.

According to guidelines contained in the *Groundwater and Treatment System Sampling and Analysis Plan for Young – Rainey STAR Center*, Draft, January 2002, duplicate samples should be collected at a frequency of one duplicate for every twenty or fewer samples. There were 118 groundwater samples analyzed for VOCs and six duplicate VOC samples collected. There were 78 unfiltered groundwater samples analyzed for RCRA metals and four duplicate samples. There were seven filtered groundwater samples analyzed for RCRA metals and one duplicate sample. There were 10 groundwater samples analyzed for arsenic and one duplicate. There were eight samples analyzed for FL-PRO and one duplicate. The duplicate requirement was met for this sampling event.

During the quarterly sampling event, eight trip blanks and two equipment blanks were submitted for analysis. Blanks continued to show an ongoing pattern of low-level methylene chloride results, probably due to laboratory contamination. However the level of contamination is lower than seen in the previous sampling event in October. The laboratory had reported that they moved their extraction laboratory (which uses methylene chloride) farther from the environmental laboratory and this appears to have helped reduce the level of laboratory contamination. The highest methylene chloride concentration was 2.5 µg/L. Estimated concentrations of xylenes, toluene, and ethylbenzene were also seen in some samples. All hits were above the instrument detection limit but below the reporting limit.

4.0 Treatment System and Recovery Well Performance

4.1 Northeast Site and Building 100

The Northeast Site groundwater treatment system was operational from January 1 through March 31, 2002. During this quarter, all available recovery wells in the Northeast Site wellfield and at Building 100 were operational, with the exception of the wells with pneumatic pumps at the Northeast Site (RW06, 11, 16, and 17). A broken compressed air line was experienced in mid-March and had not been repaired by the end of March; repair is expected in April.

Table 12 provides a summary of analytical results for samples collected at the Northeast Site Treatment System during this quarter. FeRemede® continues to be utilized to effectively control the deposition of iron and hardness salts. The application of sodium hypochlorite as a microbiocide was resumed in December.

From January 1 through March 31, 2002, 2,449,505 gallons of groundwater were recovered from the Northeast Site and Building 100 recovery wells. The volume of recovered groundwater treated by the Northeast Site Treatment System since its startup in June 1997 through March 2002 is presented in Chart 1. Charts 2, 3, and 4 present the monthly volume of groundwater recovered during January through March 2002 from the Northeast Site recovery wells.

A Recovery Well Drawdown Enhancement Plan was implemented this quarter. The goal of the plan was to optimize groundwater recovery at wells in the Northeast Site wellfield and at Building 100. Per the plan, the groundwater recovery rate at four Northeast Site wells and one Building 100 well was increased. To date, the result has been an increase of several gallons per minute in groundwater recovery at the treatment system influent and an increase in contaminant mass recovery.

The treatment system and recovery wells experienced short periods of downtime during the month of March due to minor modifications of piping to better allow annual flowmeter calibration activities. Aside from these few hours of downtime, system and wellfield operations were continuous throughout the balance of the quarter. The monthly groundwater recovery from January through March 2002 for the Building 100 recovery wells is presented in Charts 5, 6, and 7, respectively.

Total percent on-time for the Northeast Site air stripper tower (AST) is illustrated in Chart 8. On-time for the AST for this quarter was affected by the above-described minor outages. Historical Summary of Groundwater at the Northeast Site and Building 100 is shown in Appendix D as Table D–1.

Table 13 in this report presents the calculated mass of selected analytes recovered with the Northeast Site treatment system for each month of this reporting period. These monthly results are based on the measured system influent concentration and influent groundwater flow.

4.2 Wastewater Neutralization Area

The two recovery wells (PIN18–RW02 and –RW03) continue to produce approximately 2.5 gallons per minute continuously with an electrical submersible pump set in each well at approximately 12 ft below land surface. The effluent groundwater from each well is combined into a common header pipe and discharged into the industrial wastewater-receiving tank at the IWNF. During this quarter, 509,383 gallons of groundwater were recovered from the IWNF. Since start-up on February 26, 2001, both wells have operated continuously.

5.0 Current and Project Work

5.1 Summary

Work for January through March 2002 included sampling of groundwater monitoring wells and recovery wells for water quality, flow, and water levels. The treatment system and recovery wells were operated during the entire quarter, except for some short periods of downtime in March (described in Section 4.0).

5.2 Project Work Conducted

- The Northeast Site treatment system influent, clear well, and effluent were sampled during the quarter. Treatment system effluent samples were analyzed for VOCs and the effluent discharge volume was recorded to comply with the Pinellas County wastewater permit. In the effluent samples, all volatile organic aromatic concentrations were under the Pinellas County regulatory limit of 50 µg/L.

- Maintenance performed during the quarter consisted of painting activities and electrical maintenance at the treatment system and recovery wells.

6.0 Conclusions

The following conclusions are based on the quarterly sampling conducted in January 2002.

- No significant changes in the surficial groundwater flow direction or relative potentiometric levels were observed for the prevailing pumping and seasonal recharge conditions.
- The highest concentration of VOCs was detected at the Northeast Site well PIN15–RW06.
- The cone of depression at the Northeast Site includes the area of monitoring well PIN15–0558 and the southernmost portion of the contaminant plume.
- Concentrations of VOCs decreased in downgradient monitoring well PIN15–0558 and the operation of recovery well PIN15–RW16 appears to be controlling plume movement along the southern perimeter of the Northeast Site.

7.0 Tasks to Be Performed Next Quarter

The following tasks are expected to be conducted during the next quarterly period (April through June 2002):

- Quarterly sampling activities will occur in early April 2002.
- Bi-weekly and monthly sampling and analysis of groundwater will continue in order to provide compliance and system operations data.
- Treatment system optimization will continue as new issues develop.
- Utilization of the dedicated bladder pumps for quarterly sampling using the micropurging technique will continue.
- Abandonment of underground utilities in Area A at the Northeast Site.
- Abandonment of selected monitoring and recovery wells at the Northeast Site and Building 100.
- Begin construction of the in situ thermal remediation system in Area A at the Northeast Site.

8.0 References

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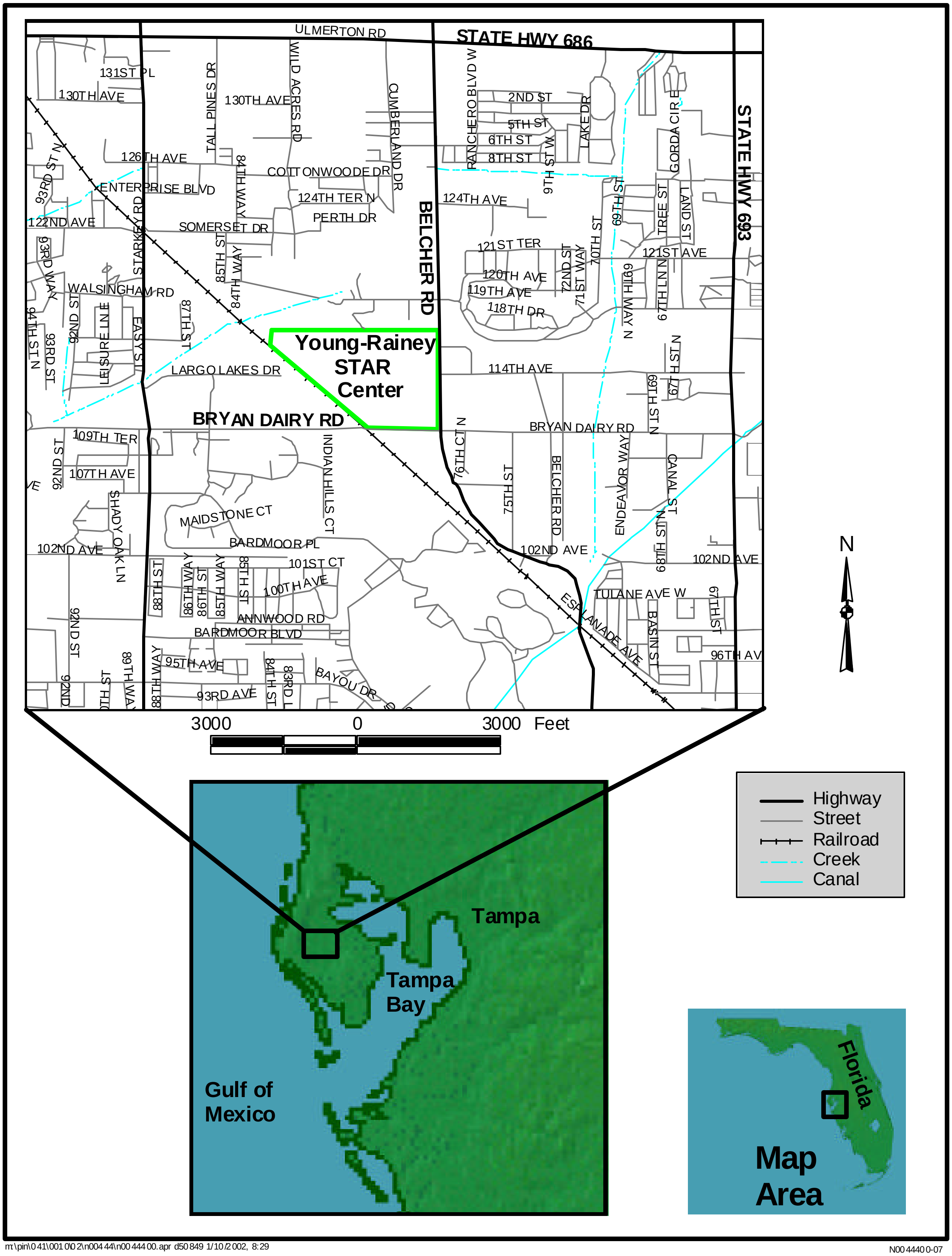

Figure 1. Young - Rainey STAR Center Location

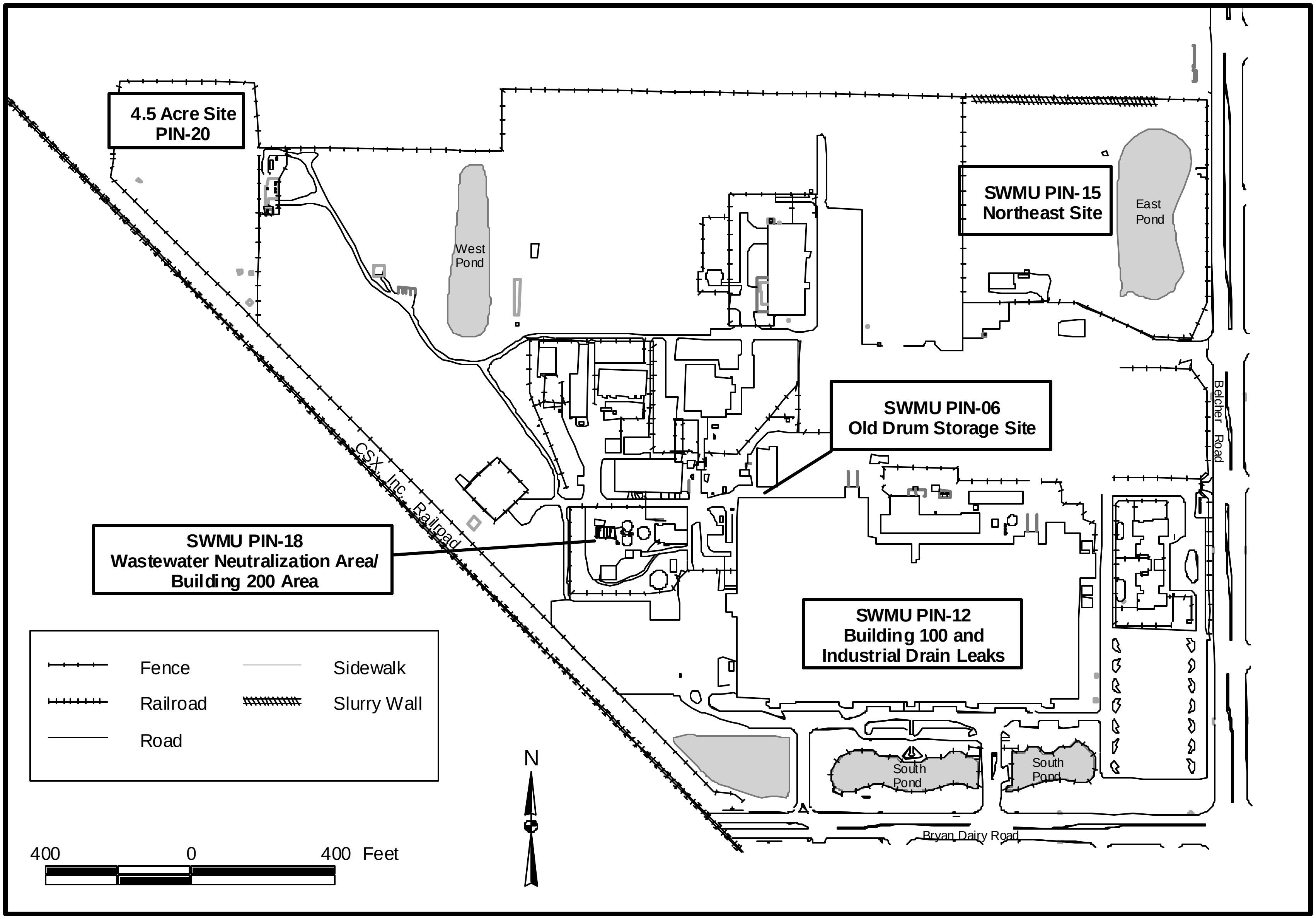

Figure 2. Location of STAR Center Solid Waste Management Units (SWMUs)

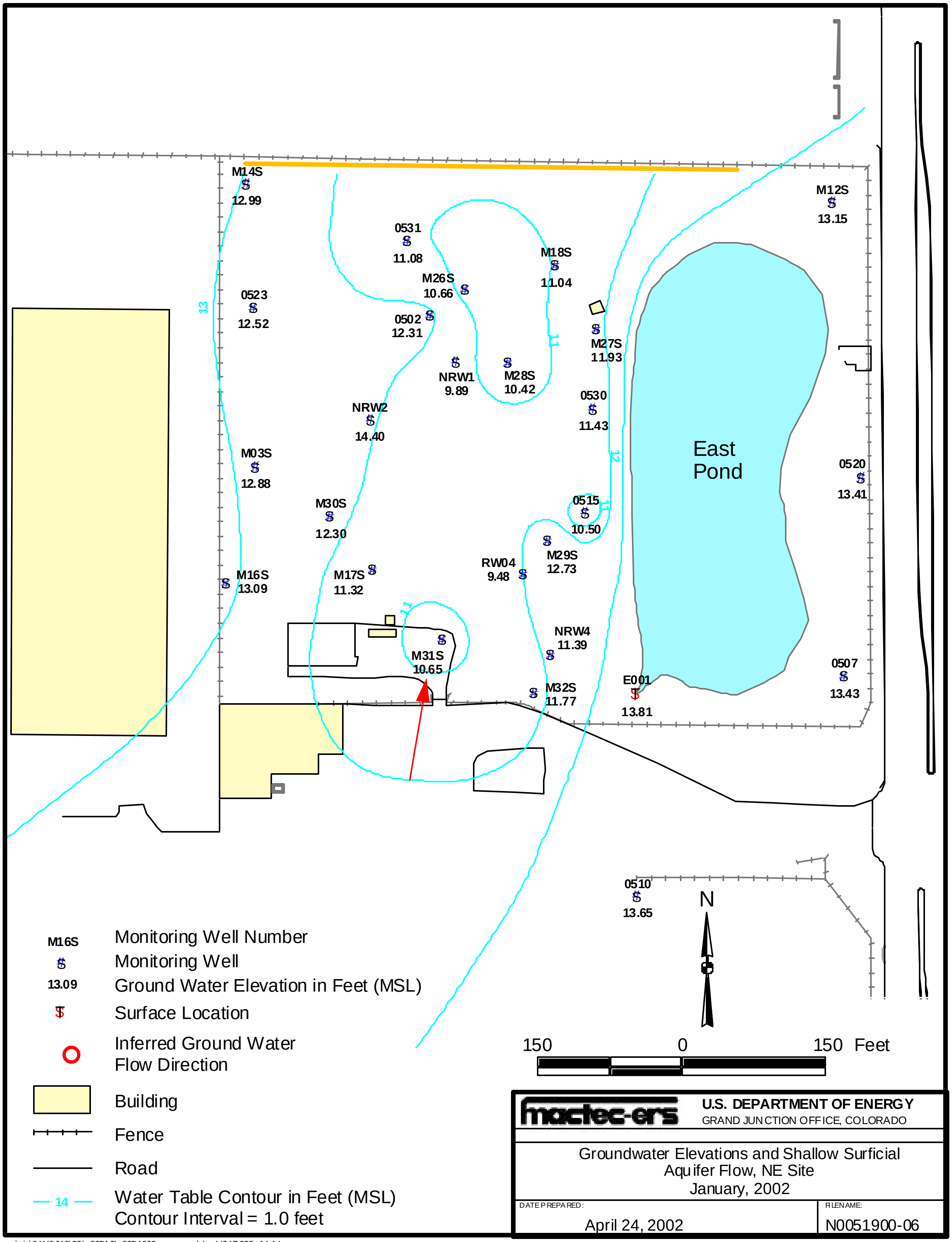

Figure 3. Groundwater Elevations and Shallow Surficial Aquifer Flow, Northeast Site, January 2002

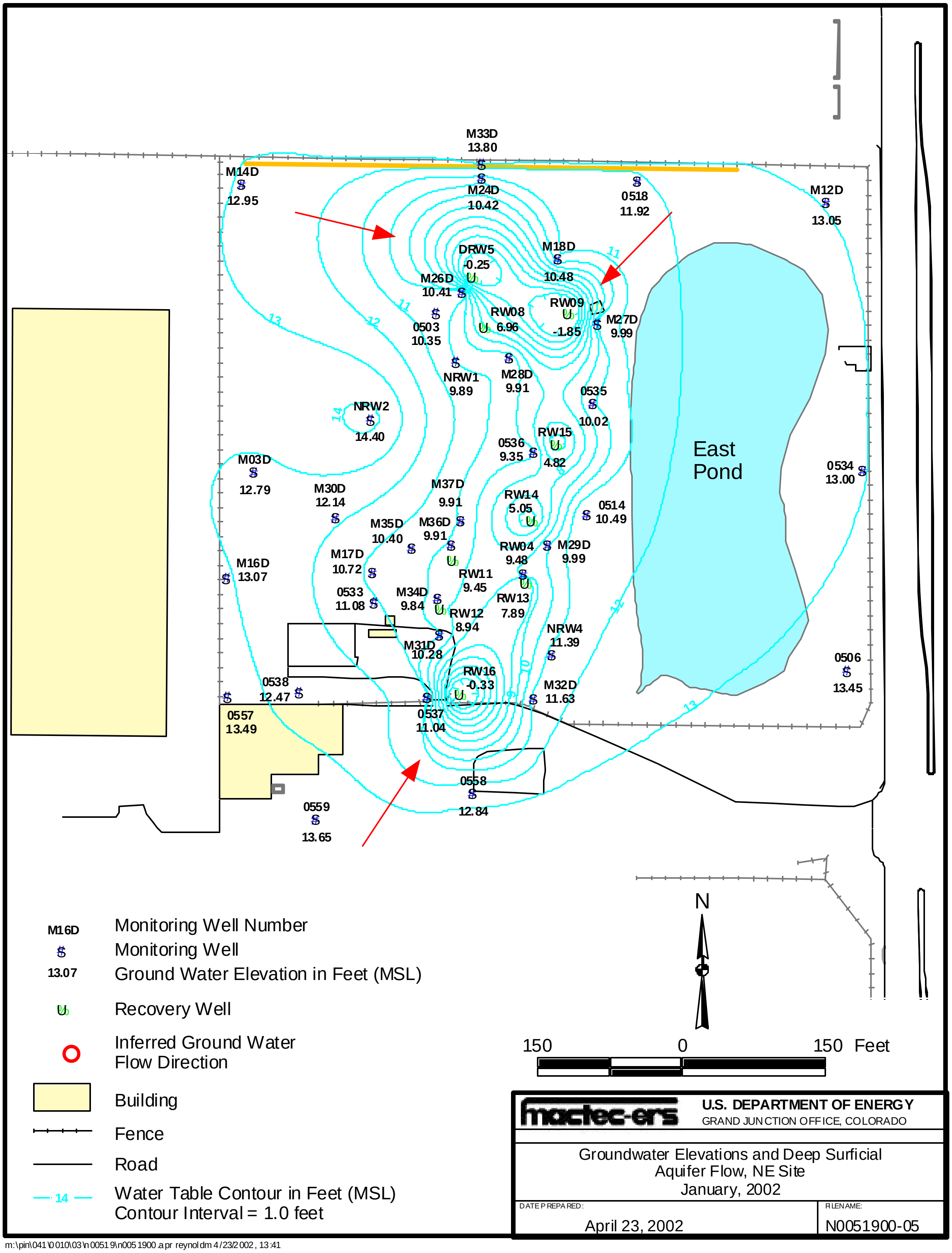

Figure 4. Groundwater Elevations and Deep Surficial Aquifer Flow, Northeast Site, January 2002

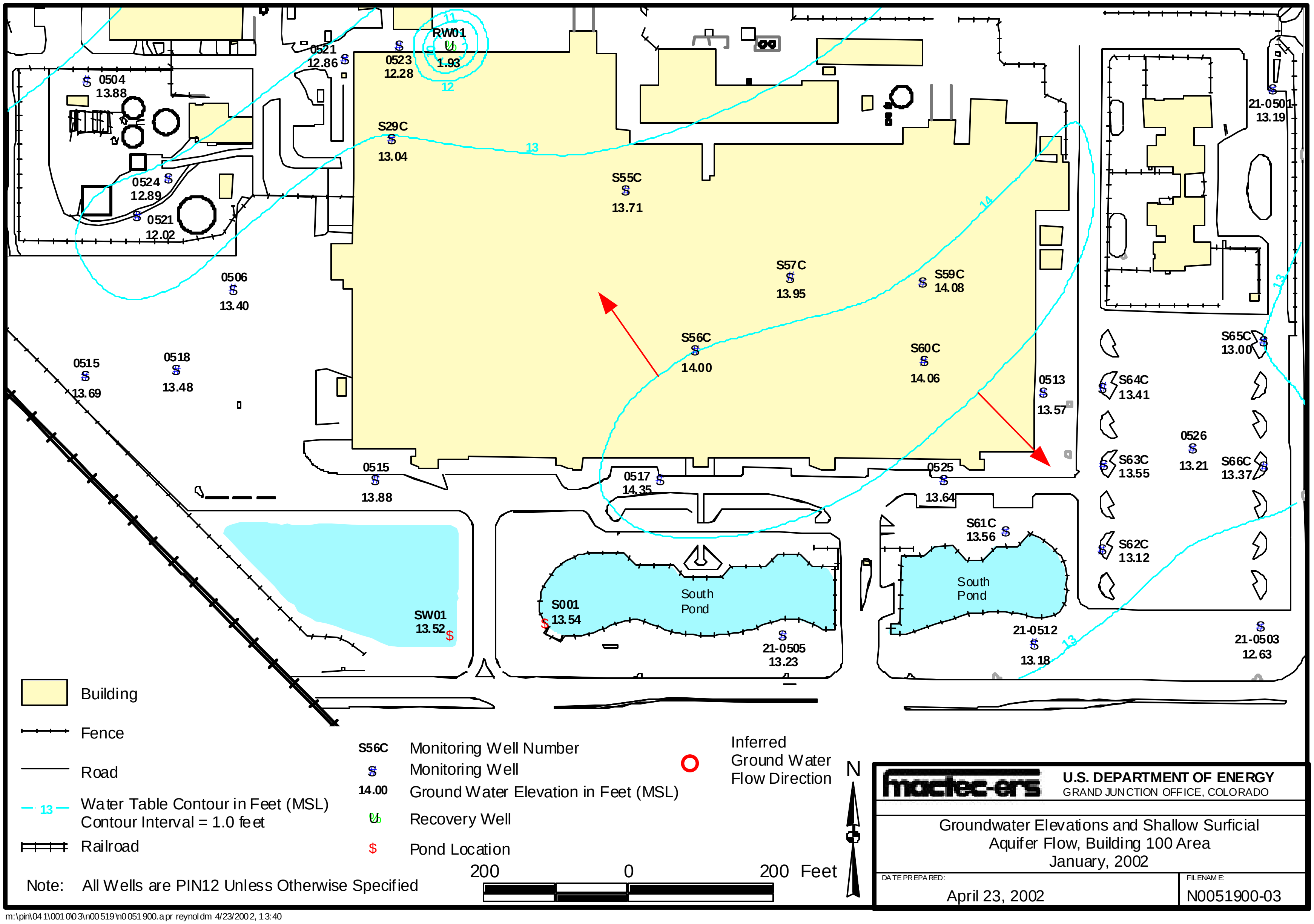

Figure 5. Groundwater Elevations and Shallow Surficial Aquifer Flow, Building 100 Area, January 2002

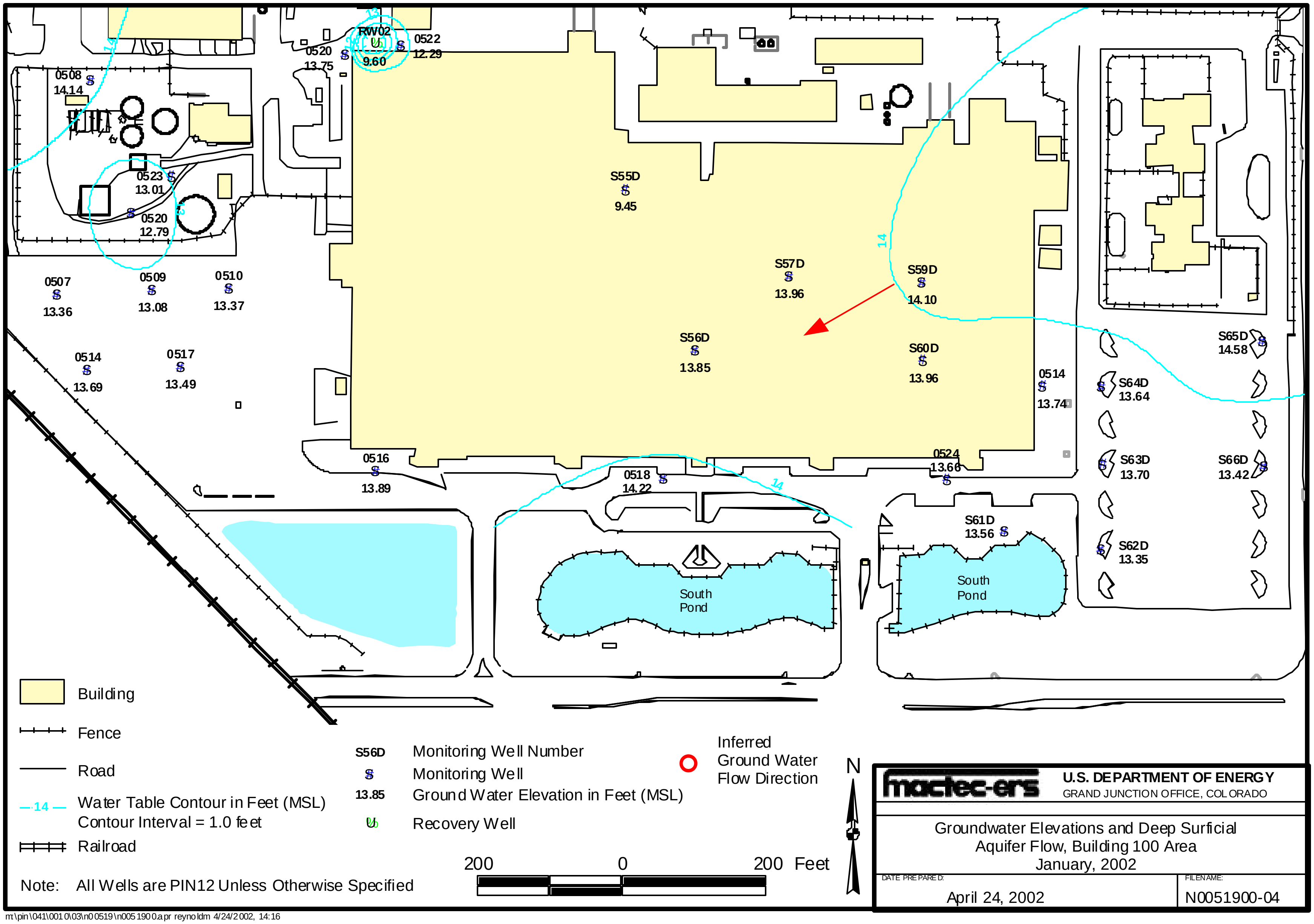

Figure 6. Groundwater Elevations and Deep Surficial Aquifer Flow, Building 100 Area, January 2002

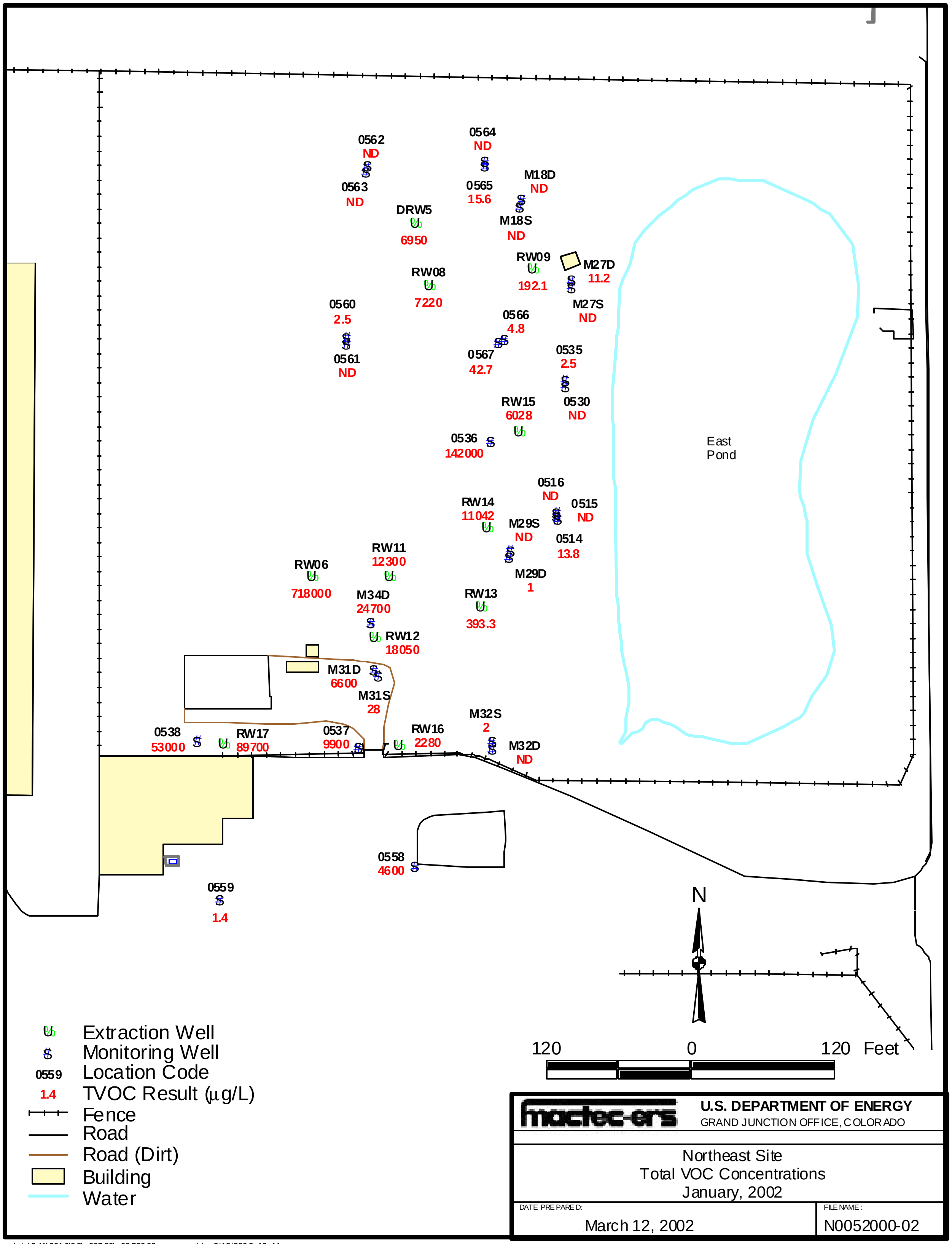

Figure 7. Total VOCs Concentrations at the Northeast Site, January 2002 (wells without VOC values or "NDs" were not sampled during this quarter)

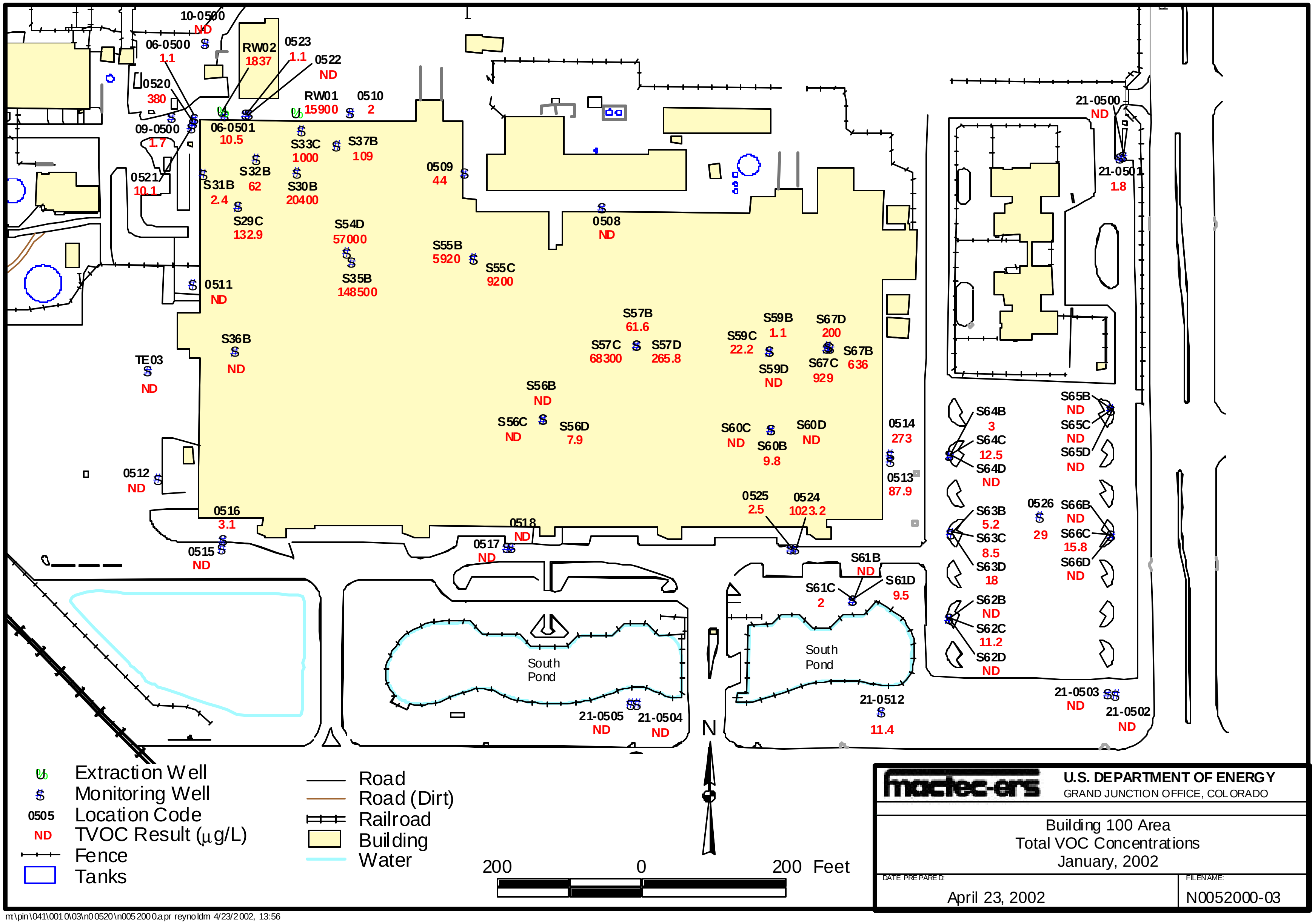

Figure 8. Total VOCs Concentrations at Building 100, January 2002

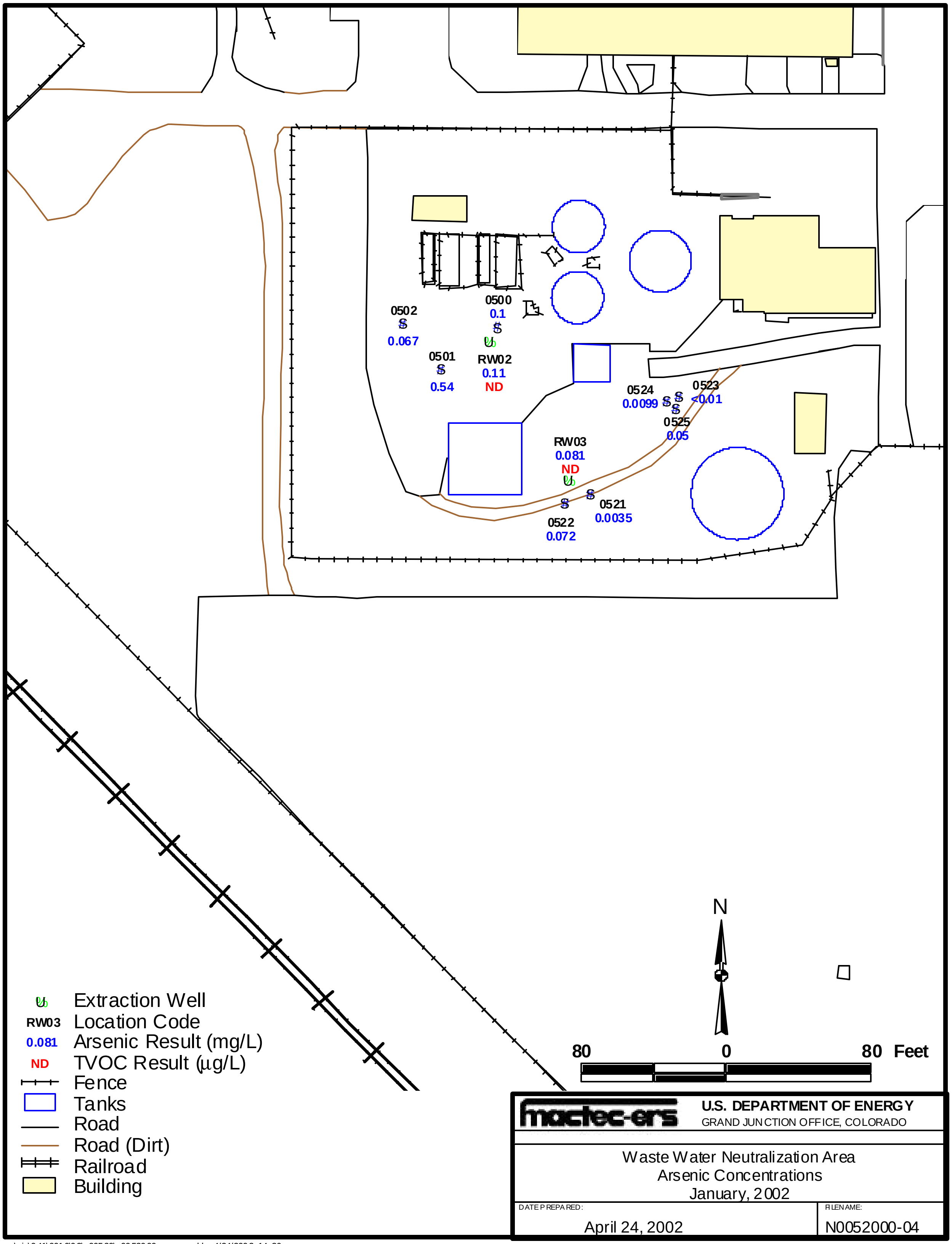

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Figure 9. Arsenic Concentrations at the WWNA, January 2002

Table 1. WWNA Recovery Well Startup Monitoring Arsenic Concentrations (reported in milligrams per liter)

Sample Date	RW02	RW03	RW02/RW03 Combined Effluent
2/26/2001	0.08	0.1	0.095
2/27/2001	0.074	0.1	0.091
2/28/2001	0.074	0.091	0.074
3/1/2001	0.084	0.096	0.088
3/2/2001	0.088	0.095	0.089
3/5/2001	0.13	0.22	0.1
3/12/2001	0.37	0.11	0.13
3/19/2001	0.42	0.12	0.12
3/26/2001	0.15	0.16	0.8
4/2/2001	0.18	0.12	0.13
4/16/2001	0.18	0.17	0.13
5/1/2001	0.16	0.071	0.1
5/15/2001	0.14	0.15	0.093
5/30/2001	0.13	0.07	0.16
6/11/2001	0.11	0.068	0.083
6/26/2001	0.13	0.067	0.096
7/9/2001	0.14	0.054	0.087
7/23/2001	0.14	0.25	0.074
8/6/2001	0.11	0.2	0.18
8/21/2001	0.13	0.074	0.084
9/5/2001	0.13	0.054	0.091
10/8/2001	0.11	0.14	0.07
11/6/2001	0.095	0.053	0.076
12/7/2001	0.13	0.081	0.084
1/10/2002	0.11	0.081	0.076
2/5/2002	0.11	0.055	0.075
3/6/2002	0.12	0.05	0.076

Table 2. Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
PIN02	**West Pond**			
502D	1/7/02	13:30	3.53	14.97
W002	1/7/02	09:44		15.25
PIN05	**Trench Site**			
0500	1/7/02	09:37	4.17	14.33
PIN06	**Old Drum Storage Site**			
0500	1/7/02	14:13	4.73	13.27
0501	1/7/02	14:14	5.21	13.09
PIN09	**Incinerator Site**			
0500	1/7/02	14:10	3.89	14.08
PIN10	**Incinerator Ditch**			
0500	1/7/02	14:30	4.09	13.81
PIN12	**Industrial Drain Leaks Building 100**			
0508	1/7/02	14:46	4.27	14.09
0509	1/7/02	14:44	4.27	13.77
0510	1/7/02	14:38	4.99	13.07
0511	1/7/02	15:46	4.41	13.39
0513	1/7/02	15:52	4.93	13.57
0514	1/7/02	15:53	4.76	13.74
0515	1/7/02	17:06	4.02	13.88
0516	1/7/02	17:05	4.11	13.89
0517	1/7/02	17:10	3.55	14.35
0518	1/7/02	17:11	3.72	14.22
0520	1/7/02	14:13	4.26	13.75
0521	1/7/02	14:12	5.19	12.86
0522	1/7/02	14:32	5.91	12.29
0523	1/7/02	14:34	5.88	12.28
0524	1/7/02	17:13	3.75	13.66
0525	1/7/02	17:14	3.78	13.64
0526	1/7/02	15:59	3.61	13.21
0527	1/7/02	14:53	10.73	7.34
0528	1/7/02	17:00	10.41	7.19
RW01	1/7/02	14:35	16.32	1.93
RW02	1/7/02	14:25	8.73	9.6
S29C	1/7/02	14:46	5.47	13.04
S30B	1/7/02	14:30	5.5	13.01
S31B	1/7/02	14:35	5.32	13.19
S32B	1/7/02	14:41	5.53	12.98
S33C	1/7/02	14:11	5.7	12.81
S35B	1/7/02	13:57	5.23	13.28
S36B	1/7/02	14:40	5.04	13.47
S37B	1/7/02	14:17	5.41	13.1
S54D	1/7/02	14:03	4.8	13.71
S55B	1/7/02	13:38	4.78	13.73
S55C	1/7/02	13:43	4.8	13.71

Table 2 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
S55D	1/7/02	13:48	9.06	9.45
S56B	1/7/02	11:47	4.56	13.95
S56C	1/7/02	11:49	4.51	14
S56D	1/7/02	11:51	4.66	13.85
S57B	1/7/02	12:02	4.51	14
S57C	1/7/02	12:05	4.56	13.95
S57D	1/7/02	12:06	4.55	13.96
S59B	1/7/02	11:27	4.42	14.09
S59C	1/7/02	11:27	4.43	14.08
S59D	1/7/02	11:28	4.41	14.1
S60B	1/7/02	11:20	4.54	13.97
S60C	1/7/02	11:22	4.45	14.06
S60D	1/7/02	11:22	4.55	13.96
S61B	1/7/02	16:57	4.11	13.89
S61C	1/7/02	16:59	4.44	13.56
S61D	1/7/02	17:00	4.44	13.56
S62B	1/7/02	15:29	2.44	13.47
S62C	1/7/02	15:32	2.79	13.12
S62D	1/7/02	15:30	2.56	13.35
S63B	1/7/02	15:36	3.18	13.47
S63C	1/7/02	15:39	3.1	13.55
S63D	1/7/02	15:40	2.95	13.7
S64B	1/7/02	15:44	4.37	13.61
S64C	1/7/02	15:49	4.57	13.41
S64D	1/7/02	15:45	4.34	13.64
S65B	1/7/02	15:07	4.32	13.63
S65C	1/7/02	15:09	4.95	13
S65D	1/7/02	15:08	3.37	14.58
S66B	1/7/02	15:18	2.91	13.62
S66C	1/7/02	15:17	3.16	13.37
S66D	1/7/02	15:20	3.11	13.42
S67B	1/7/02	11:09	4.61	13.86
S67C	1/7/02	11:08	4.56	13.91
S67D	1/7/02	11:07	4.64	13.84
TE03	1/7/02	15:54	3.45	13.55
PIN15	**Northeast Site**			
0502	1/7/02	10:38	5.49	12.31
0503	1/7/02	10:37	7.65	10.35
0506	1/7/02	12:12	3.55	13.45
0507	1/7/02	12:10	3.57	13.43
0510	1/7/02	12:57	3.87	13.65
0513	1/7/02	12:20	10.46	7.14
0514	1/7/02	10:00	7.01	10.49
0515	1/7/02	10:01	7	10.5
0516	1/7/02	10:02	5.03	12.37

Table 2 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
0518	1/7/02	10:16	5.88	11.92
0520	1/7/02	12:17	3.79	13.41
0523	1/7/02	10:45	5.48	12.52
0530	1/7/02	10:06	5.97	11.43
0531	1/7/02	10:41	6.52	11.08
0533	1/7/02	12:55	6.92	11.08
0534	1/7/02	12:16	4.3	13
0535	1/7/02	10:04	7.58	10.02
0536	1/7/02	10:03	8.25	9.35
0537	1/7/02	10:52	7.56	11.04
0538	1/7/02	10:50	6.33	12.47
0557	1/7/02	10:49	5.61	13.49
0558	1/7/02	13:22	5.4	12.84
0559	1/7/02	13:25	5.14	13.65
0560	1/7/02		7.39	10.61
0561	1/7/02		7.18	10.82
0562	1/7/02	10:24	7.19	10.61
0563	1/7/02	10:24	6.78	11.02
0564	1/7/02	10:15	6.93	10.27
0565	1/7/02	10:14	6.4	10.8
0566	1/7/02	10:09	7.67	9.83
0567	1/7/02	10:07	6.73	10.77
B002	1/7/02	10:37	7.31	10.69
B003	1/7/02	10:25	6.73	10.57
B004	1/7/02		7.9	10.5
B005	1/7/02	10:30	6.89	10.71
DRW5	1/7/02	13:18	17.85	-0.25
E001	1/7/02	12:08	2.21	13.81
M03D	1/7/02	10:47	5.31	12.79
M03S	1/7/02	10:46	5.22	12.88
M12D	1/7/02	12:22	4.15	13.05
M12S	1/7/02	12:23	4.35	13.15
M14D	1/7/02	10:42	5.05	12.95
M14S	1/7/02	10:43	5.01	12.99
M16D	1/7/02	10:47	5.13	13.07
M16S	1/7/02	10:48	5.11	13.09
M17D	1/7/02	12:53	6.88	10.72
M17S	1/7/02	12:54	6.18	11.32
M18D	1/7/02	10:15	6.72	10.48
M18S	1/7/02	10:12	6.16	11.04
M24D	1/7/02	10:18	7.38	10.42
M26D	1/7/02	10:21	7.29	10.41
M26S	1/7/02	10:22	6.94	10.66
M27D	1/7/02	10:11	7.61	9.99
M27S	1/7/02	10:07	5.67	11.93

Table 2 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
M28D	1/7/02	10:27	7.69	9.91
M28S	1/7/02	10:28	7.28	10.42
M29D	1/7/02	09:58	7.61	9.99
M29S	1/7/02	09:59	4.87	12.73
M30D	1/7/02	12:58	5.76	12.14
M30S	1/7/02	12:51	5.5	12.3
M31D	1/7/02	12:31	7.72	10.28
M31S	1/7/02	12:30	7.35	10.65
M32D	1/7/02	09:55	6.17	11.63
M32S	1/7/02	09:56	6.03	11.77
M33D	1/7/02	10:20	3.8	13.8
M34D	1/7/02	12:32	8.26	9.84
M35D	1/7/02	12:44	7.6	10.4
M36D	1/7/02	12:33	7.89	9.91
M37D	1/7/02	12:34	8.09	9.91
NRW1	1/7/02	10:35	8.31	9.89
NRW2	1/7/02	13:13	3.5	14.4
NRW4	1/7/02	09:57	5.81	11.39
RW03	1/7/02	12:41	7.58	10.32
RW04	1/7/02	13:06	8.12	9.48
RW06	1/7/02	12:49	36.06	-18.06
RW07	1/7/02	13:10	9.09	8.51
RW08	1/7/02	10:26	10.74	6.96
RW09	1/7/02	10:10	19.35	-1.85
RW10	1/7/02	12:46	8.27	9.63
RW11	1/7/02	12:35	8.55	9.45
RW12	1/7/02	12:34	9.36	8.94
RW13	1/7/02	13:07	9.71	7.89
RW14	1/7/02	13:11	12.85	5.05
RW15	1/7/02	10:05	12.38	4.82
RW16	1/7/02	10:55	18.33	-0.33
PIN18	**Wastewater Neutralization Area**			
0500	1/7/02	13:52	8.31	11.79
0501	1/7/02	13:53	7.46	12.54
0502	1/7/02	13:54	6.88	13.12
0503	1/7/02	15:57	4.33	13.35
0504	1/7/02	13:55	5.72	13.88
0505	1/7/02	13:56	4.8	13.08
0506	1/7/02	15:50	4.31	13.4
0507	1/7/02	17:25	4.37	13.36
0508	1/7/02	15:56	5.36	14.14
0509	1/7/02	13:58	4.75	13.08
0510	1/7/02	15:51	4.39	13.37
0511	1/7/02	13:39	4.17	14.63
0512	1/7/02	13:38	3.96	14.64

Table 2 (continued). Water-Level Data at the STAR Center

Location	Measurement		Water Depth From Land Surface (ft)	Ground Water Elevation (ft NGVD)
	Date	Time		
0513	1/7/02	13:37	4.11	14.69
0514	1/7/02	16:53	4.09	13.69
0515	1/7/02	16:51	4.15	13.69
0516	1/7/02	16:52	4.2	13.62
0517	1/7/02	16:57	4.76	13.49
0518	1/7/02	16:56	4.72	13.48
0519	1/7/02	16:55	4.78	13.5
0520	1/7/02	13:49	5.21	12.79
0521	1/7/02	13:50	6.08	12.02
0522	1/7/02	13:48	6.11	11.99
0523	1/7/02	13:44	6.39	13.01
0524	1/7/02	13:46	6.11	12.89
0525	1/7/02	13:45	6.01	12.89
0526	1/7/02	15:19	4.2	14.4
RW02	1/7/02	15:34	11.26	8.84
RW03	1/7/02	15:35	15.21	3.09
PIN21	**Perimeter Monitor Well**			
0500	1/7/02	15:00	4.8	13.3
0501	1/7/02	14:59	4.81	13.19
0502	1/7/02	15:23	2.04	13.16
0503	1/7/02	15:24	2.57	12.63
0504	1/7/02	17:06	4.46	13.14
0505	1/7/02	17:06	4.17	13.23
0512	1/7/02	17:02	4.12	13.18
PIN23	**Southwest Pond**			
SW01	1/7/02	17:18		13.52
PIN37	**South Pond**			
S001	1/7/02	17:15		13.54

Table 3. Floridan Aquifer Monitoring Well Water Elevations

Well Identification	Previous Water Level Elevation (ft, MSL)	Current Water Level Elevation (ft, MSL)
PIN15–0513	7.70	7.14
PIN12–0527	7.90	7.34
PIN12–0528	7.82	7.19

Table 4. Vertical Hydraulic Differential

Water Level Measured From	Well Identification	Water Level Elevation (ft, MSL)
Deep Surficial Aquifer	PIN15–M12D	13.05
Floridan Aquifer	PIN15–0513	7.14

Table 5. Surface Water Elevations

Pond Location	Previous Water Level Elevation (ft, MSL)	Current Water Level Elevation (ft, MSL)
East Pond	13.70	13.81
South Pond	13.57	13.54
West Pond	NM	15.25
Southwest Pond	13.55	13.52

NM = not measured

Table 6. Field Measurements of Samples Collected at the STAR Center

Location	Temperature (°C)	Specific Conductance (μmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN06	**Old Drum Storage Site**					
0500	22.88	950	2.8	6.8	-40	1.64
0501	22.68	1,162	24.6	6.74	28.6	2.02
PIN09	**Incinerator Site**					
0500	24.19	1,254	12.8	6.92	-45.5	2.36
PIN10	**Incinerator Ditch**					
0500	22.29	656	9.3	6.89	29.7	1.62
PIN12	**Industrial Drain Leaks Building 100**					
0508	20.51	713	4.4	6.66	112	1.57
0509	22.47	1,130	1.8	6.89	84	2.39
0510	21.26	1,118	27	6.27	157.5	2.1
0511	24.23	357	13.1	6.6	61	1.85
0512	24.38	614	1.8	6.63	3.1	1.5
0513	23.4	881	1.71	6.93	-100	0.13
0514	23.7	1,654	15.3	6.77	-83	0.32
0515	26.2	782	0.8	6.87	-79	1.46
0516	25.14	1,252	24.9	6.75	-60	1.89
0517	26.45	754	121	7	-53	1.13
0518	26.52	777	22.1	6.83	-10.4	1.43
0520	25.06	1,480	77.8	6.82	2	1.99
0521	26.07	978	14.7	7.02	-84.8	1.5
0522	24.17	1,421	13.5	6.81	-18.8	2.23
0523	24.63	1,059	25.3	6.89	-54.5	1.65
0524	26.27	1,410	11.9	6.67	-40	1.81
0525	26.29	699	40	6.84	15.1	1.26
0526	29.27	2,052	19.6	6.62	-19	1.95
0527	27.48	1,497	15.6	7.09	-75.1	1.36
0528	24.64	1,247	6	7.46	-254	0.87
S29C	23.1	1,230	2.99	6.89	-113	0.11
S30B	22.85	1,310	4.07	6.96	98	0.59
S31B	24.33	717	6.66	6.91	-75	0.13
S32B	22.63	1,153	3.2	6.89	55	0.28
S33C	23	1,264	81.1	6.92	-99	0.12
S35B	22.47	1,670	23.9	6.62	-18	0.19
S36B	23.59	633	13.1	6.49	-36	0.12
S37B	22.52	985	12.6	6.94	-86	0.18
S54D	23.05	1,468	11.2	6.92	-108	--
S55B	23.62	563	202	6.75	-126	--
S55C	23.75	735	13.4	7.09	-218	--
S56B	22.87	1,504	>1,000	6.95	-123	--
S56C	22.92	1,563	394	7.07	-134	--
S56D	22.95	1,640	204	7.06	-100	--
S57B	23.26	1,283	543	7.15	-149	--
S57C	23.12	1,018	558	6.91	-143	--

Table 6 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
S57D	23.13	1,502	115	6.99	-102	--
S59B	20.5	819	>1,000	8.9	--	--
S59C	20.6	1,028	77.3	9.7	-46	--
S59D	22	1,409	17.1	7.22	-108	--
S60B	19.7	697	267	7.46	-120	--
S60C	21.5	379	323	9.03	15	--
S60D	21.78	490	654	8.83	38	--
S61B	23.64	1,107	27.1	7.07	-104	--
S61C	22.24	797	93	7.56	-97	--
S61D	25.2	1,545	4.3	6.83	-76	--
S62B	24.51	300	585	6.77	89	--
S62C	28.27	1,692	16.7	6.7	-47.9	--
S62D	26.94	1,461	3.5	6.87	-66	--
S63B	27.6	1,888	8.9	6.88	-94	--
S63C	26.99	790	97.4	8.13	-106	--
S63D	27.55	1,568	17.8	6.84	-113.4	--
S64B	28.03	1,308	22.3	6.82	-130	--
S64C	28.13	1,347	43.4	6.89	-117	--
S64D	28.39	1,463	10.2	6.75	-100	--
S65B	25.16	247	75.2	6.52	129	--
S65C	23.46	767	170	7.74	-27	--
S65D	28.39	1,487	1,503	6.8	-216	--
S66B	26.87	623	90	7.63	-127	--
S66C	27.61	652	227	7.81	-137	--
S66D	29.25	1,529	116	6.76	-51	--
S67B	21.8	1,337	188	6.9	-84	0.59
S67C	21.6	1,458	192	6.86	-90	0.41
S67D	22.05	1,503	519	6.93	-116	0.32
TE03	25.93	729	9.8	6.81	43.9	1.53
PIN15	**Northeast Site**					
0514	23.7	650	37	6.46	-196	0.29
0515	23.1	452	1.41	7.29	-193	0.11
0516	19.2	505	3.53	7.1	144	--
0530	23.2	491	32.9	7.16	-126	1.2
0535	23.7	1,825	197	6.79	-144	0.07
0536	24.5	1,636	109.9	6.52	1.6	2.48
0537	26.83	1,111	4.1	6.7	-54.9	1.91
0538	22.64	1,316	157.7	6.44	-92.2	1.3
0558	26.38	1,294	20	6.68	-32.8	1.87
0559	25.81	1,413	95.9	6.81	46.3	1.5
0560	24.39	1,545	19.3	6.79	-18.1	1.86
0561	24.28	1,455	70.7	6.75	3.4	2.02
0562	24.61	1,523	113.6	6.8	9.7	1.84
0563	24.62	2,834	89.5	6.72	-42.1	1.95

Table 6 (continued). Field Measurements of Samples Collected at the STAR Center

Location	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
0564	25.09	1,818	42.2	6.78	-8.7	1.18
0565	24.27	1,136	29.1	6.68	-22.7	2.1
0566	23.54	1,919	99.8	6.79	-4.8	1.31
0567	23.11	1,377	85.7	6.87	-234	1.17
M18D	24.26	1,969	85	6.85	47.5	2.14
M18S	22.78	855	20.9	6.92	45.9	5.8
M27D	23.4	1,941	46.6	6.73	-119	0.83
M27S	22.6	383	2.95	7.35	-169	0.87
M29D	24.42	325	1.8	6.46	-14.3	1.58
M29S	23.61	835	33.7	6.94	45.7	2.01
M31D	24.88	1,545	3	6.64	-49.7	2.21
M31S	24.07	1,209	3.6	6.99	-84.5	2.54
M32D	24.8	1,448	11.8	6.7	-146	0.22
M32S	23.4	1,196	8.18	6.91	-84	0.21
M34D	24.86	1,187	41.3	6.56	-27.3	2.4
PIN18	**Wastewater Neutralization Area**					
0500	23.03	455	20.1	7.32	-109.4	1.4
0501	24.3	824	16.1	6.99	-61.5	1.47
0502	24.46	734	10.4	6.85	-34.4	2.23
0521	24.53	926	3.9	6.94	-71.9	2.36
0522	23.48	714	98.1	6.86	-34.8	2.12
0523	24.23	1,013	72.7	6.91	-36.7	1.91
0524	24.65	597	19.5	6.99	-74.9	1.17
0525	23.35	632	18.7	6.78	89.3	1.61
PIN21	**Perimeter Monitor Wells**					
0500	25.1	819	44.9	6.81	-75	0.2
0501	26.8	1,449	22.1	6.95	-79	0.18
0502	24.2	827	3.55	6.89	-80	0.08
0503	25.5	875	10.6	6.89	-94	0.07
0504	22.8	846	11.2	6.95	-84	0.17
0505	24.2	1,061	15.8	6.86	-103	0.18
0512	24	948	31.2	6.88	-103	0.13

[a]temperature corrected to 25°C
--Not measured

Table 7. VOCs in Samples Collected at the STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
PIN06	**Old Drum Storage Site**								
0500	0.17J	1.1	<1	<1	<1	0.18J	<1	0.64J	1.1[c]
0501	<1	0.2J	<1	<1	<1	<1	<1	1.6J	10.5[c]
PIN09	**Incinerator Site**								
0500	0.25J	0.24J	<1	<1	<1	<1	<1	0.59J	1.7[c]
PIN10	**Incinerator Ditch**								
0500	0.8J	0.64J	<1	<1	<1	<1	<1	<5	ND
PIN12	**Industrial Drain Leaks Building 100**								
0508	<1	<1	<1	<1	<1	<1	<1	<5	ND
0509	44	<1	<1	<1	<1	<1	<1	<5	44
0510	0.22J	0.17J	<1	<1	2	<1	<1	<5	2
0511	<1	<1	<1	<1	<1	<1	<1	<5	ND
0512	<1	<1	<1	<1	<1	<1	<1	<5	ND
0513	<1	19	1.9	0.47J	40	27	<1	<5	87.9
0514	<1	61	75	0.77J	120	17	<1	<5	273
0515	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
0516	<1	<1	<1	<1	3.1	<1	<1	<5	3.1
0517	<1	<1	<1	<1	<1	<1	<1	<5	ND
0518	<1	<1	<1	<1	<1	<1	<1	<5	ND
0520	<5	270	<5	<5	110	<5	<5	5.1J	380[b]
0521	1.4	1.5	<1	<1	<1	<1	<1	0.6J	10.1[b,c]
0522	0.79J	<1	<1	<1	<1	<1	<1	<5	ND
0523	0.55J	1.1	<1	<1	<1	<1	<1	0.48J	1.1
0524	<10	670	8.2	25	320	<10	<10	<50	1,023.2[c]
0525	<1	2.5	<1	<1	<1	<1	<1	<5	2.5[c]
0526	<1	13	7.9	<1	8.1	0.17J	<1	0.65J	29
RW01	9,600	5,200	27J	24J	1,100	<100	<100	<500	15,900[c]
RW02	890	800	50	7.8J	97	<25	<25	<120	1,837
S29C	<1	1.1	7.7	<1	120	4.1	<1	2.1J	132.9[b]
S30B	11,000	9,400	240J	<250	<250	<250	<250	<1,200	20,400
S31B	1.1	1.3	<1	<1	<1	<1	<1	2.6J	2.4[c]
S32B	0.36J	16	2.2	4	9.8	16	<1	1.6J	62[c]
S33C	7.5J	340	22	8.5J	580	58	<10	30J	1,000[b]
S35B	44,000	76,000	9,500	320J	19,000	<1,000	<1,000	<5,000	148,500
S36B	<1	<1	<1	<1	<1	<1	<1	1.6J	ND
S37B	0.43J	53	1.2	<1	46	0.47J	8.8	1.2J	109[b]
S54D	15,000	42,000	250J	420J	<500	<500	<500	<2,500	57,000
S55B	<50	820	<50	<50	5,100	<50	<50	<250	5,920[b]
S55C	<100	6,600	53J	<100	2,600	<100	<100	<500	9,200[c]
S56B	<1	<1	<1	<1	<1	<1	<1	1.3J	ND
S56C	<1	<1	<1	<1	<1	<1	<1	1.2J	ND
S56D	1.3	5.2	0.25J	<1	1.4	<1	<1	1.1J	7.9
S57B	27	23	<1	1.6	10	<1	<1	1J	61.6
S57C	850J	26,000	460J	1,300	41,000	<1,000	<1,000	660J	68,300

Table 7 (continued). VOCs in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
S57D	3J	100	1.6J	5.8	160	<5	<5	5.2J	265.8
S59B	<1	0.44J	<1	<1	<1	1.1	<1	<5	1.1
S59C	<1	7.4	<1	<1	12	<1	<1	<5	22.2[c]
S59D	<1	<1	<1	<1	<1	<1	<1	<5	ND
S60B	<1	3.4	<1	0.54J	<1	6.4	0.24J	<5	9.8[b]
S60C	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
S60D	<1	<1	<1	<1	<1	<1	<1	<5	ND
S61B	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
S61C	2	0.24J	<1	<1	<1	<1	<1	<5	2
S61D	<1	3.7	<1	<1	5.8	<1	<1	1.7J	9.5[c]
S62B	0.72J	0.5J	<1	<1	<1	<1	<1	1.2J	ND
S62C	<1	2.7	1.4	<1	7.1	<1	<1	1.4J	11.2
S62D	<1	<1	<1	<1	<1	<1	<1	1.2J	ND
S63B	<1	1.9	<1	<1	3.3	<1	<1	2.4J	5.2[b]
S63C	<1	0.42J	0.22J	<1	8.5	0.91J	<1	4J	8.5[b]
S63D	<1	0.37J	0.51J	<1	17	1	<1	4.1J	18[b]
S64B	<1	<1	<1	<1	3	<1	<1	2.2J	3[b]
S64C	<1	1.9	1.1	<1	9.5	<1	<1	<5	12.5
S64D	<1	<1	<1	<1	<1	<1	<1	<5	ND[b]
S65B	<1	<1	<1	<1	<1	<1	<1	0.45J	ND
S65C	<1	<1	<1	<1	<1	<1	<1	0.95J	ND
S65D	<1	<1	<1	<1	<1	<1	<1	0.47J	ND
S66B	0.78J	0.51J	<1	<1	<1	<1	<1	0.98J	ND[c]
S66C	0.68J	8.9	4.8	<1	2.1	<1	<1	1.1J	15.8[c]
S66D	<1	<1	<1	<1	<1	<1	<1	1.9J	ND
S67B	<10	51	6.1J	0.34J	470	94	<10	17J	636[c]
S67C	<10	270	47	<10	550	62	<10	18J	929
S67D	0.13J	110	27	1.4	57	4.6	<1	1.8J	200
TE03	<1	<1	<1	<1	<1	<1	<1	0.87J	ND
PIN15	**Northeast Site**								
0514	<1	<1	<1	<1	3	0.17J	<1	0.32J	13.8[b]
0515	<1	<1	<1	<1	<1	<1	<1	<5	ND
0516	<1	<1	<1	<1	<1	<1	<1	1.3J	ND
0530	<1	<1	<1	<1	<1	<1	<1	1.5J	ND
0535	0.13J	0.73J	<1	<1	<1	<1	<1	<5	2.5[b]
0536	110,000	32,000	<2,500	<2,500	1,800J	<2,500	<2,500	<12,000	142,000
0537	29J	7,800	67J	<250	2,100	<250	<250	<250	9,900[b]
0538	<500	11,000	58J	<500	40,000	<500	<500	<2,500	53,000[b]
0558	<50	<50	<50	<50	4,600	<50	<50	<250	4,600[b]
0559	1.4	0.55J	<1	<1	<1	<1	<1	1.3J	1.4[b]
0560	<1	<1	<1	<1	<1	<1	<1	3.1J	2.5[c]
0561	<1	<1	<1	<1	<1	<1	<1	<5	ND
0562	<1	<1	<1	<1	<1	<1	<1	<5	ND[c]
0563	<1	<1	<1	<1	<1	<1	<1	<5	ND

Table 7 (continued). VOCs in Samples Collected at the STAR Center
(reported in micrograms per liter)

Location	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl chloride	1,1-DCA	Chloro-ethane	Methylene chloride	Total VOCs[a]
0564	<1	<1	<1	<1	<1	<1	<1	4.4J	ND[b]
0565	6.9	5.1	<1	<1	3.6	<1	<1	3.5J	15.6[b]
0566	<1	<1	<1	<1	<1	<1	<1	<5	4.8[b]
0567	0.42J	28	9.7	0.26J	5	<1	<1	<5	42.7[b]
DRW5	650	2,100	<50	8J	2,600	<50	<50	710	6,950[b]
M18D	0.19J	<1	<1	<1	<1	<1	<1	<5	ND[c]
M18S	0.54J	0.18J	<1	<1	<1	<1	<1	<5	ND
M27D	<1	<1	<1	<1	<1	<1	<1	1.3J	11.2[b]
M27S	<1	<1	<1	<1	<1	<1	<1	0.48J	ND
M29D	<1	<1	<1	<1	<1	<1	<1	<5	1[b,c]
M29S	<1	<1	<1	<1	<1	<1	<1	0.39J	ND
M31D	<50	3,400	<50	<50	3,200	<50	<50	63J	6,600[b]
M31S	<1	0.75J	<1	<1	25	<1	<1	<5	28[b]
M32D	<1	<1	<1	<1	<1	<1	<1	0.67J	ND[b]
M32S	0.35J	2	<1	<1	0.55J	<1	<1	<5	2
M34D	<250	9,700	68J	<250	15,000	<250	<250	<1,200	24,700[b]
RW06	72,000	61,000	1,100J	<5,000	22,000	<5,000	<5,000	520,000	718,000[b]
RW08	190	1,600	15J	9.2J	2,200	<25	<25	2,600	7,220[b]
RW09	<1	29	0.26J	<1	82	<1	<1	<5	192.1[b]
RW11	<250	2,700	<250	<250	6,600	<250	<250	290J	12,300[b]
RW12	250	7,200	<250	<250	9,300	<250	<250	<1,200	18,050[b]
RW13	0.62J	120	<2.5	<2.5	59	<2.5	<2.5	110	393.3[b]
RW14	430	3,000	<50	6.4J	4,900	<50	<50	2,100	11,042[b]
RW15	2,700	2,300	38	12J	990	<25	<25	29J	6,028[b]
RW16	<50	680	<50	<50	1,600	<50	<50	<250	2,280
RW17	<1,000	61,000	<1,000	<1,000	27,000	<1,000	<1,000	<5,000	89,700[b]
PIN18	**Wastewater Neutralization Area**								
RW02	<1	<1	<1	<1	<1	<1	<1	<5	ND
RW03	<1	0.49J	<1	<1	<1	<1	<1	0.41J	ND[b]
PIN21	**Perimeter Monitor Wells**								
0500	<1	<1	<1	<1	<1	<1	<1	<5	ND
0501	<1	1.8	0.14J	<1	<1	<1	<1	0.54J	1.8
0502	<1	<1	<1	<1	<1	<1	<1	0.82J	ND
0503	<1	<1	<1	<1	<1	<1	<1	1.4J	ND
0504	<1	<1	<1	<1	<1	<1	<1	<5	ND
0505	<1	<1	<1	<1	<1	0.27J	<1	<5	ND
0512	<1	2.8	0.22J	<1	8.6	<1	<1	<5	11.4[c]

[a]"J" values are not included in the "Total VOCs" value.
[b]See the "BTEX Table" for additional analytical results.
[c]See the "Additional VOCs Table" for additional analytical results.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection limit.

Table 8. BTEX Compounds in Samples Collected at the STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
PIN06	**Old Drum Storage Site**				
0500	<1	<1	<1	ND	ND
0501	<1	<1	<1	ND	ND
PIN09	**Incinerator Site**				
0500	<1	<1	<1	ND	ND
PIN10	**Incinerator Ditch**				
0500	<1	<1	<1	ND	ND
PIN12	**Industrial Drain Leaks Building 100**				
0508	<1	<1	<1	ND	ND
0509	<1	<1	<1	ND	ND
0510	<1	<1	<1	ND	ND
0511	<1	<1	<1	ND	ND
0512	<1	<1	<1	ND	ND
0513	<1	<1	<1	ND	ND
0514	<1	<1	<1	ND	ND
0515	<1	<1	<1	0.72J	ND
0516	<1	<1	<1	ND	ND
0517	<1	<1	<1	ND	ND
0518	<1	<1	<1	ND	ND
0520	<5	1.3J	<5	ND	ND
0521	0.15J	<1	<1	ND	ND
0522	<1	<1	<1	ND	ND
0523	<1	<1	<1	ND	ND
0524	<10	<10	<10	ND	ND
0525	<1	<1	<1	ND	ND
0526	<1	<1	<1	ND	ND
RW01	<100	<100	<100	ND	ND
RW02	<25	<25	<25	ND	ND
S29C	0.45J	<1	<1	ND	ND
S30B	<250	<250	<250	ND	ND
S31B	<1	<1	<1	ND	ND
S32B	<1	<1	<1	ND	ND
S33C	2.1J	<10	<10	ND	ND
S35B	<1,000	<1,000	<1,000	ND	ND
S36B	<1	<1	<1	ND	ND
S37B	0.2J	<1	<1	ND	ND
S54D	<500	<500	<500	ND	ND
S55B	34J	<50	<50	ND	ND
S55C	<100	<100	<100	ND	ND
S56B	<1	<1	<1	ND	ND
S56C	<1	<1	<1	ND	ND
S56D	<1	<1	<1	ND	ND
S57B	<1	<1	<1	ND	ND
S57C	<1,000	<1,000	<1,000	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
S57D	<5	<5	<5	ND	ND
S59B	<1	<1	<1	ND	ND
S59C	<1	<1	<1	ND	ND
S59D	<1	<1	<1	ND	ND
S60B	0.14J	<1	<1	ND	ND
S60C	<1	0.27J	<1	ND	ND
S60D	<1	<1	<1	ND	ND
S61B	<1	<1	<1	0.15J	ND
S61C	<1	<1	<1	ND	ND
S61D	<1	<1	<1	ND	ND
S62B	<1	<1	<1	ND	ND
S62C	<1	<1	<1	ND	ND
S62D	<1	<1	<1	ND	ND
S63B	<1	0.26J	<1	ND	ND
S63C	<1	0.36J	<1	ND	ND
S63D	<1	0.44J	<1	ND	ND
S64B	<1	0.23J	<1	ND	ND
S64C	<1	<1	<1	ND	ND
S64D	<1	0.12J	0.13J	0.41J	ND
S65B	<1	<1	<1	ND	ND
S65C	<1	<1	<1	ND	ND
S65D	<1	<1	<1	ND	ND
S66B	<1	<1	<1	ND	ND
S66C	<1	<1	<1	ND	ND
S66D	<1	<1	<1	ND	ND
S67B	<10	<10	<10	ND	ND
S67C	<10	<10	<10	ND	ND
S67D	<1	<1	<1	ND	ND
TE03	<1	<1	<1	ND	ND
PIN15	**Northeast Site**				
0514	7.9	1.6	0.4J	1.3	10.8
0515	<1	<1	<1	ND	ND
0516	<1	<1	<1	ND	ND
0530	<1	<1	<1	ND	ND
0535	1.5	1	<1	0.15J	2.5
0536	<2,500	<2,500	<2,500	ND	ND
0537	<250	31J	<250	ND	ND
0538	75J	2,000	<500	ND	2,000
0558	13J	<50	<50	ND	ND
0559	0.12J	0.72J	<1	0.2J	ND
0560	<1	<1	<1	ND	ND
0561	<1	<1	<1	ND	ND
0562	<1	<1	<1	ND	ND
0563	<1	<1	<1	ND	ND

Table 8 (continued). BTEX Compounds in Samples Collected at the Pinellas STAR Center (reported in micrograms per liter)

Location	Benzene	Toluene	Ethylbenzene	Total Xylenes[a]	Total BTEX[b]
0564	<1	<1	0.22J	0.76J	ND
0565	<1	0.71J	<1	ND	ND
0566	1.1	3.7	0.17J	0.64J	4.8
0567	0.2J	<1	<1	ND	ND
DRW5	13J	890	<50	ND	890
M18D	<1	<1	<1	ND	ND
M18S	<1	<1	<1	ND	ND
M27D	10	1.2	0.46J	0.32J	11.2
M27S	<1	<1	<1	ND	ND
M29D	1	<1	<1	0.12J	1
M29S	<1	<1	<1	ND	ND
M31D	<50	34J	<50	ND	ND
M31S	3	0.25J	<1	ND	3
M32D	0.23J	<1	<1	ND	ND
M32S	<1	<1	<1	ND	ND
M34D	47J	48J	100J	ND	ND
RW06	<5,000	43,000	<5,000	ND	43,000
RW08	8.8J	630	<25	6.6J	630
RW09	10	66	1.2	3.9	81.1
RW11	56J	3,000	<250	ND	3,000
RW12	32J	1,300	<250	ND	1,300
RW13	9.3	94	0.58J	1	104.3
RW14	29J	550	24J	62	612
RW15	5.9J	14J	<25	12.7J	ND
RW16	<50	<50	<50	ND	ND
RW17	<1,000	1,700	<1,000	ND	1700
PIN18	**Wastewater Neutralization Area**				
RW02	<1	<1	<1	ND	ND
RW03	<1	<1	0.21J	0.14J	ND
PIN21	**Perimeter Monitor Wells**				
0500	<1	<1	<1	ND	ND
0501	<1	<1	<1	ND	ND
0502	<1	<1	<1	ND	ND
0503	<1	<1	<1	ND	ND
0504	<1	<1	<1	ND	ND
0505	<1	<1	<1	ND	ND
0512	<1	<1	<1	ND	ND

[a]m-, o-, p- Xylene if detected.
[b]"J" values are not included in the "Total BTEX" value.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection

Table 9. Additional VOCs in Samples Collected at the STAR Center (reported in micrograms per liter)

Location	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,3-Dichloro-benzene	1,4-Dichloro-benzene	Chloroform	Dichloro-difluoro-methane	Tetrachloro-ethene	Trichloro-fluoro-methane
PIN06	**Old Drum Storage Site**							
0500		0.21J						0.41J
0501	0.32J		1.2	9.3				
PIN09	**Incinerator Site**							
0500						0.34J		1.7
PIN12	**Industrial Drain Leaks Building 100**							
0521		0.36J				1.9		5.3
0524								5.5J
0525						0.77J		
RW01							22J	
S31B						0.37J		
S32B						14		
S55C					16J			
S59C								2.8
S61D								0.46J
S66B						0.67J		
S66C						0.75J		
S67B						21		
PIN15	**Northeast Site**							
0560						2.5		
0562								0.86J
M18D						0.92J		
M29D						0.91J		
PIN21	**Perimeter Monitor Wells**							
0512								0.38J

J Estimated value, result is between the reporting limit and the method detection limit.

Table 10. RCRA Metals and Mercury in Samples Collected at the STAR Center (reported in milligrams per liter)

Location	Date	Sample ID[a]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
PIN06			**Old Drum Storage Site**							
0500	1/16/02	N001	0.039	0.082	<0.005	<0.01	0.0032J	<0.0002	<0.01	<0.01
0501	1/16/02	N001	0.0076J	0.084	0.001J	<0.01	0.0026J	<0.0002	<0.01	<0.01
PIN09			**Incinerator Site**							
0500	1/15/02	N001	0.025	0.082	<0.005	0.0028J	0.0061	<0.0002	<0.01	0.0027J
PIN10			**Incinerator Ditch**							
0500	1/14/02	N001	<0.01	0.04	0.0034J	<0.01	0.0038J	0.00012J	<0.01	<0.01
PIN12			**Industrial Drain Leaks Building 100**							
0508	1/16/02	N001	0.0061J	0.043	0.00075J	0.0023J	0.0067	<0.0002	<0.01	<0.01
0509	1/16/02	N001	<0.01	0.055	<0.005	<0.01	0.004J	<0.0002	<0.01	<0.01
0510	1/16/02	N001	0.0037J	0.068	<0.005	<0.01	0.0026J	<0.0002	<0.01	0.0021J
0511	1/15/02	N001	<0.01	0.016J	<0.005	<0.01	0.0028J	<0.0002	<0.01	<0.01
0512	1/16/02	N001	<0.01	0.033	<0.005	<0.01	0.0023J	<0.0002	<0.01	<0.01
0513	1/9/02	N001	<0.01	0.063	<0.005	<0.01	<0.005	0.00097	<0.01	<0.01
0514	1/9/02	N001	<0.01	0.065	<0.005	<0.01	0.0058	<0.0002	<0.01	<0.01
0515	1/15/02	N001	<0.01	0.048	<0.005	<0.01	0.0027J	<0.0002	<0.01	<0.01
0516	1/15/02	N001	<0.01	0.043	<0.005	<0.01	0.005	<0.0002	<0.01	<0.01
0517	1/16/02	N001	<0.01	0.055	<0.005	0.01	0.0062	<0.0002	<0.01	<0.01
0518	1/16/02	N001	<0.01	0.021	<0.005	0.0018J	0.0022J	<0.0002	<0.01	<0.01
0520	1/16/02	N001	<0.01	0.041	<0.005	0.009J	0.0032J	<0.0002	<0.01	0.002J
0521	1/16/02	N001	<0.01	0.053	<0.005	0.0019J	0.0025J	<0.0002	<0.01	<0.01
0522	1/14/02	N001	<0.01	0.033	<0.005	0.0036J	0.0023J	<0.0002	<0.01	<0.01
0523	1/14/02	N001	<0.01	0.057	<0.005	0.0029J	0.0027J	<0.0002	<0.01	<0.01
0524	1/15/02	N001	<0.01	0.056	<0.005	0.0019J	0.0048J	<0.0002	<0.01	<0.01
0525	1/15/02	0001	0.0094J	0.042	<0.005	<0.01	0.003J	<0.0002	<0.01	<0.01
0525	1/15/02	N001	0.019	0.046	<0.005	0.0028J	0.0043J	<0.0002	<0.01	<0.01
0526	1/16/02	N001	0.0034J	0.089	<0.005	0.0019J	0.005	<0.0002	<0.01	<0.01
0527	1/14/02	N001	<0.01	0.076	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
0528	1/15/02	N001	<0.01	0.063	<0.005	<0.01	0.0037J	<0.0002	<0.01	<0.01
RW01	1/14/02	N001	<0.01	0.04	<0.005	<0.01	0.0042J	<0.0002	<0.01	<0.01
RW02	1/14/02	N001	<0.01	0.033	<0.005	<0.01	0.0021J	<0.0002	<0.01	0.0019J
S29C	1/11/02	N001	<0.01	0.049	<0.005	<0.01	<0.005	0.000075J	<0.01	<0.01
S30B	1/11/02	0001	<0.01	0.059	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S30B	1/11/02	N001	<0.01	0.059	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S31B	1/11/02	0001	0.031	0.047	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S31B	1/11/02	N001	0.036	0.044	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S32B	1/11/02	0001	0.019	0.099	<0.005	<0.01	0.0057	0.000072J	<0.01	<0.01
S32B	1/11/02	N001	0.017	0.1	<0.005	<0.01	0.0053	0.000072J	<0.01	<0.01
S33C	1/11/02	0001	0.01	0.069	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S33C	1/11/02	N001	0.016	0.074	<0.005	<0.01	<0.005	0.000074J	<0.01	<0.01
S35B	1/11/02	0001	0.012	0.49	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S35B	1/11/02	N001	0.015	0.51	<0.005	0.011	0.0054	<0.0002	<0.01	<0.01
S36B	1/11/02	N001	<0.01	0.046	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S37B	1/11/02	N001	<0.01	0.053	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01

Table 10 (continued). RCRA Metals and Mercury in Samples Collected at the STAR Center (reported in milligrams per liter)

Location	Date	Sample ID[a]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
S54D	1/12/02	N001	<0.01	0.032	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S55B	1/12/02	N001	<0.01	0.049	<0.005	0.03	<0.005	<0.0002	<0.01	<0.01
S55C	1/12/02	N001	<0.01	0.032	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S56B	1/12/02	N001	0.021	0.17	<0.005	0.093	0.023	<0.0002	<0.01	<0.01
S56C	1/12/02	N001	0.0036J	0.093	<0.005	0.017	0.01	<0.0002	<0.01	<0.01
S56D	1/12/02	N001	0.0059J	0.12	0.0018J	0.034	0.0081	<0.0002	<0.01	<0.01
S57B	1/12/02	N001	0.0085J	0.1	<0.005	0.043	0.012	<0.0002	<0.01	<0.01
S57C	1/12/02	N001	0.0078J	0.1	<0.005	0.026	0.021	0.00011J	<0.01	<0.01
S57D	1/12/02	0001	<0.01	0.046	<0.005	0.0023J	<0.005	<0.0002	<0.01	<0.01
S57D	1/12/02	N001	<0.01	0.088	<0.005	0.013	0.0063	<0.0002	<0.01	<0.01
S59B	1/10/02	N001	0.025	0.19	<0.005	0.14	0.019	0.000098J	0.023	<0.01
S59C	1/10/02	N001	<0.01	0.029	<0.005	<0.01	<0.005	0.000073J	<0.01	<0.01
S59D	1/10/02	N001	<0.01	0.039	<0.005	<0.01	<0.005	0.000079J	<0.01	<0.01
S60B	1/10/02	N001	<0.01	0.072	<0.005	<0.01	<0.01*	<0.0002	0.011	<0.01
S60C	1/10/02	N001	<0.01	0.043	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S60D	1/10/02	N001	<0.01	0.11	<0.005	<0.01	<0.01*	0.000072J	0.012	<0.01
S61B	1/14/02	N001	<0.01	0.084	<0.005	0.0045J	<0.005	<0.0002	<0.01	<0.01
S61C	1/14/02	N001	<0.01	0.032	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S61D	1/14/02	N001	<0.01	0.045	<0.005	0.0028J	<0.005	<0.0002	<0.01	<0.01
S62B	1/15/02	N001	<0.01	0.025	<0.005	0.0026J	<0.005	<0.0002	<0.01	<0.01
S62C	1/15/02	N001	<0.01	0.066	<0.005	0.0019J	<0.005	<0.0002	<0.01	<0.01
S62D	1/15/02	N001	<0.01	0.041	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S63B	1/15/02	N001	0.0046J	0.052	<0.005	0.002J	<0.005	0.000086J	<0.01	<0.01
S63C	1/15/02	N001	<0.01	0.041	<0.005	0.0044J	0.003J	<0.0002	<0.01	<0.01
S63D	1/15/02	N001	<0.01	0.062	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S64B	1/15/02	N001	<0.01	0.048	<0.005	0.0046J	<0.005	<0.0002	<0.01	<0.01
S64C	1/15/02	N001	<0.01	0.056	<0.005	<0.01	0.0025J	<0.0002	<0.01	<0.01
S64D	1/15/02	N001	<0.01	0.054	<0.005	<0.01	0.0037J	<0.0002	<0.01	<0.01
S65B	1/14/02	N001	<0.01	0.028	<0.005	0.0077J	0.0027J	<0.0002	<0.01	<0.01
S65C	1/14/02	N001	<0.01	0.037	<0.005	0.0032J	<0.005	<0.0002	<0.01	<0.01
S65D	1/14/02	N001	0.0036J	0.06	0.00076J	0.037	0.0023J	<0.0002	<0.01	<0.01
S66B	1/14/02	N001	<0.01	0.058	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01
S66C	1/14/02	N001	<0.01	0.05	<0.005	0.0029J	<0.005	<0.0002	<0.01	<0.01
S66D	1/14/02	N001	<0.01	0.047	<0.005	0.0067J	<0.005	<0.0002	<0.01	<0.01
S67B	1/10/02	N001	<0.01	0.054	<0.005	0.011	<0.005	<0.0002	<0.01	<0.01
S67C	1/10/02	N001	<0.01	0.06	<0.005	<0.01	0.0073	0.000078J	<0.01	<0.01
S67D	1/10/02	N001	<0.01	0.067	<0.005	0.032	0.0081	0.000075J	<0.01	<0.01
TE03	1/16/02	N001	<0.01	0.03	<0.005	0.0038J	0.0023J	<0.0002	<0.01	<0.01
PIN21			**Perimeter Monitor Wells**							
0500	1/9/02	N001	0.0033J	0.047	<0.005	0.0058J	0.0051	<0.0002	<0.01	<0.01
0501	1/9/02	N001	0.0037J	0.064	<0.005	<0.01	0.005	<0.0002	<0.01	<0.01
0502	1/9/02	N001	0.0074J	0.052	<0.005	<0.01	0.0044J	<0.0002	<0.01	<0.01
0503	1/9/02	N001	<0.01	0.034	<0.005	<0.01	0.00325	<0.0002	<0.01	<0.01
0504	1/9/02	N001	0.012	0.036	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01

Table 10 (continued). RCRA Metals and Mercury in Samples Collected at the STAR Center (reported in milligrams per liter)

Location	Date	Sample ID[a]	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
0505	1/9/02	N001	<0.01	0.022	<0.005	<0.01	<0.005	0.000073J	<0.01	<0.01
0512	1/9/02	N001	<0.01	0.04	<0.005	<0.01	<0.005	<0.0002	<0.01	<0.01

[a]N001 is an unfiltered sample, 0001 is a filtered sample

J Estimated value, result is between the reporting limit and the method detection limit.

Table 11. Arsenic Concentrations at the WWNA
(reported in milligrams per liter)

Well	Date	Arsenic
0500	1/15/2002	0.1
0501	1/15/2002	0.54
0502	1/15/2002	0.067
0521	1/15/2002	0.0035J
0522	1/14/2002	0.072
0523	1/15/2002	<0.01
0524	1/15/2002	0.0099J
0525	1/15/2002	0.05
RW02	1/10/2002	0.11
RW02	2/5/2002	0.11
RW02	3/6/2002	0.12
RW03	1/10/2002	0.081
RW03	2/5/2002	0.055
RW03	3/6/2002	0.05

Table 12. Summary of Analytical Results for Groundwater Samples Collected at the Northeast Site Treatment System
(reported in micrograms per liter unless otherwise noted)

Location	Date Sampled	cis-1,2-DCE	trans-1,2-DCE	TCE	Methylene chloride	Vinyl chloride	Toluene	Benzene	MTBE	Total VOCs[a]	$CaCO_3$ mg/L	Fe mg/L
PIN15		**Northeast Site**										
INF1	1/10/2002	4,100	22J	1,300	8,100	1,200	520	<100	<1,000	15,220	490	4.4
INF1	1/22/2002	3,900	66J	1,700	7,300	1,300	480	<100	98J	14,680	480	4.1
INF1	2/5/2002	3,300	<100	1,600	4,600	920	240	<100	<1,000	10,660	400	5
INF1	2/21/2002	9,200	43J	3,100	15,000	2,700	320	<250	<2,500	30,320	460	4
INF1	2/25/2002	4,000	<100	1,300	4,600	1,500	440	<100	<1,000	11,840	--	--
INF1	3/6/2002	3,600	<100	960	3,900	840	180	<100	<1,000	9,480	470	4.2
INF1	3/11/2002	4,600	<100	970	4,800	1,600	460	<100	<1,000	12,430	--	--
INF1	3/18/2002	3,200	<100	700	53J	1,200	250	<100	<1,000	5,350	470	5.2
EFF1	1/10/2002	0.15J	<1	<1	0.93J	<1	0.18J	<1	<10	ND	490	4.4
EFF1	1/22/2002	<1	<1	<1	<5	<1	<1	<1	<10	ND	500	4.2
EFF1	2/5/2002	<1	<1	<1	1.1J	<1	<1	<1	<10	ND	450	5.9
EFF1	2/21/2002	<1	<1	<1	0.39J	<1	<1	<1	<10	ND	470	18
EFF1	2/25/2002	<1	<1	<1	<5	<1	<1	<1	<10	ND	--	--
EFF1	3/6/2002	<1	<1	<1	<5	<1	<1	<1	<10	ND	450	3.5
EFF1	3/11/2002	<1	<1	<1	1.5J	<1	<1	<1	<10	ND	--	--
EFF1	3/18/2002	<1	<1	<1	<5	<1	<1	<1	<10	ND	480	4.2

[a]"J" values are not included in the "Total VOCs" value.
ND Not detected.
J Estimated value, result is between the reporting limit and the method detection limit.
-- Not Measured

Table 13. Estimated Mass of VOCs Recovered from the Northeast Site and Building 100 Recovery Wells During January, February, and March 2002

Month	Volume Treated (gallons)	Concentration[a]						
		cis-1,2-DCE (µg/L)	trans-1,2-DCE (mg/L)	Toluene (µg/L)	TCE (µg/L)	Methylene Chloride (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
January 2002	758,352	4,000	44	500	1,500	7,700	1,250	14,994
February 2002	763,260	5,500	48	333	2,000	8,067	1,707	17,654
March 2002	927,893	3,800	50	297	877	2,918	1,213	9,154

Month	Volume Treated (gallons)	Recovery[b]						
		cis-1,2-DCE (lbs)	trans-1,2-DCE (lbs)	Toluene (lbs)	TCE (lbs)	Methylene Chloride (lbs)	Vinyl Chloride (lbs)	Total VOCs (lbs)
January 2002	758,352	25.3	0.3	3.2	9.5	48.7	7.9	94.9
February 2002	763,260	35.0	0.3	2.1	12.7	51.4	10.9	112.5
March 2002	927,893	29.4	0.4	2.3	6.8	22.6	9.4	70.9

[a]These concentrations represent the average of weekly sampling results.
[b]Includes “J” (estimated) values. For any detection of “<”, which indicates the laboratory could not detect that analyte, 50 percent of the “<” value was used for the calculation of recovery.

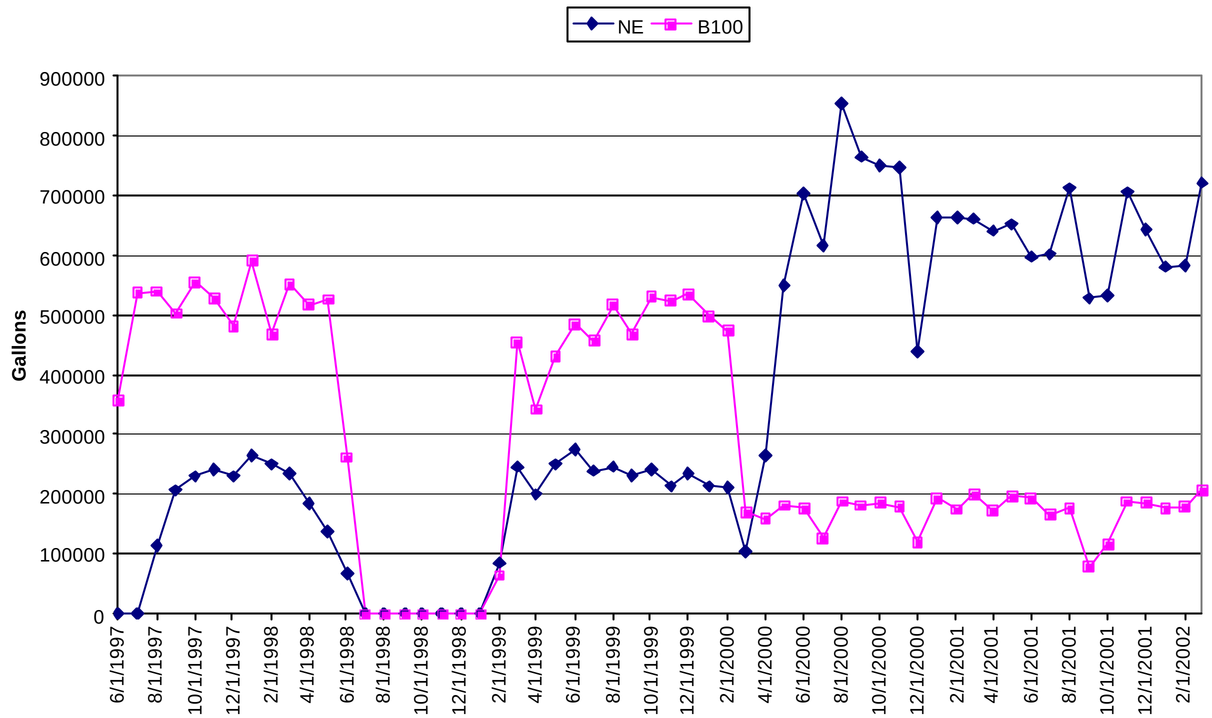

Chart 1. Historical Northeast Site and Building 100 Groundwater Recovery

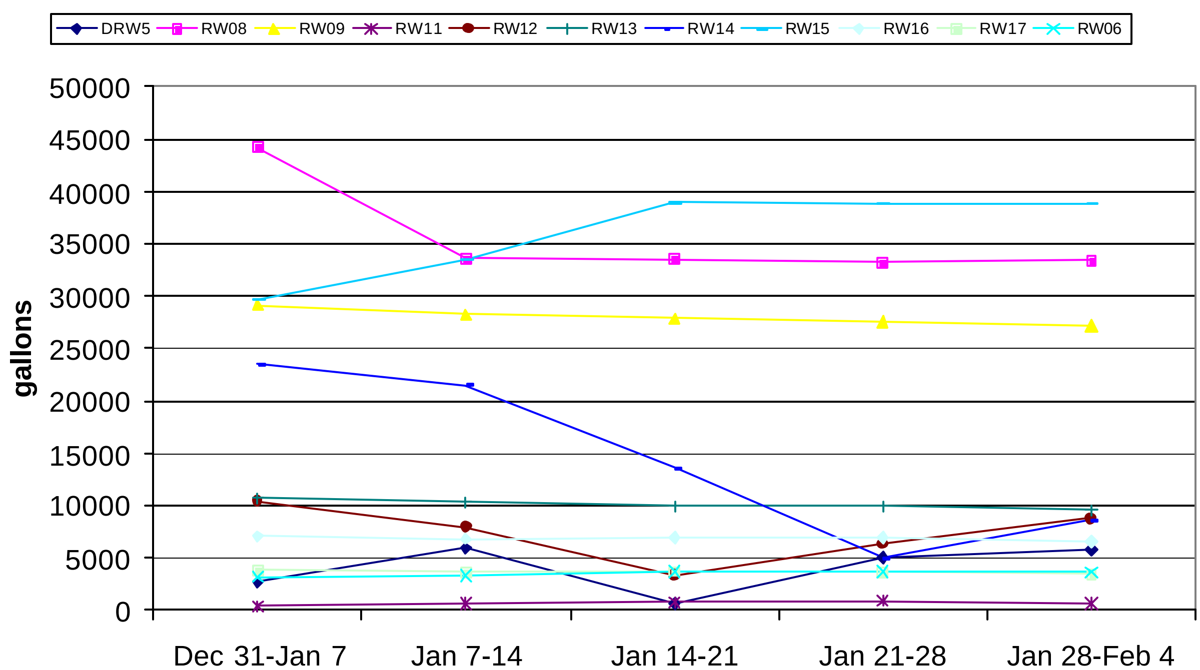

Chart 2. January 2002 Northeast Site (Individual Wells) Groundwater Recovery

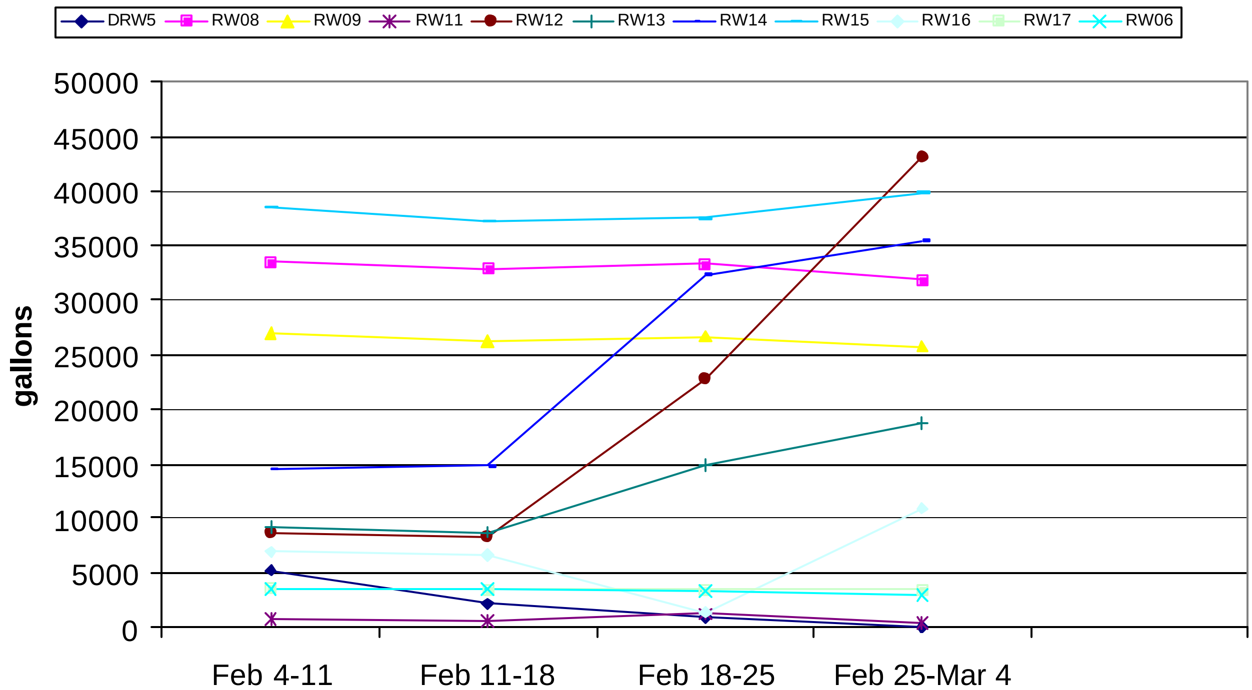

Chart 3. February 2002 Northeast Site (Individual Wells) Groundwater Recovery

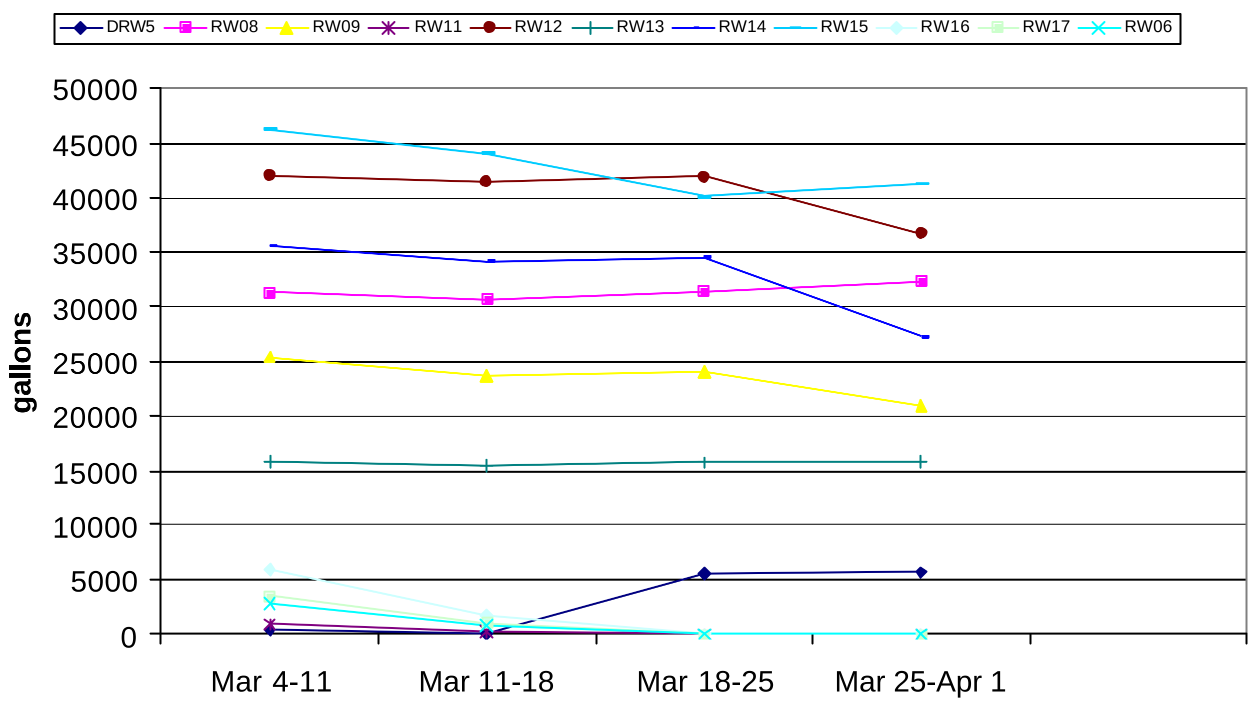

Chart 4. March 2002 Northeast Site (Individual Wells) Groundwater Recovery

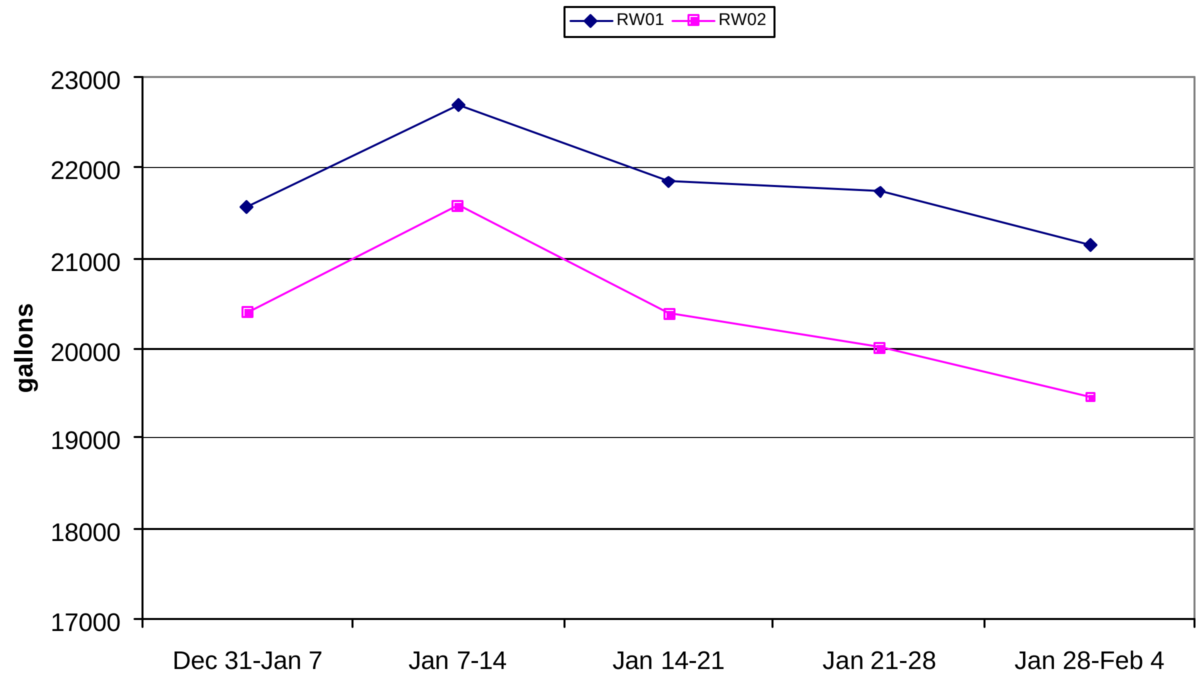

Chart 5. January 2002 Building 100 Groundwater Recovery

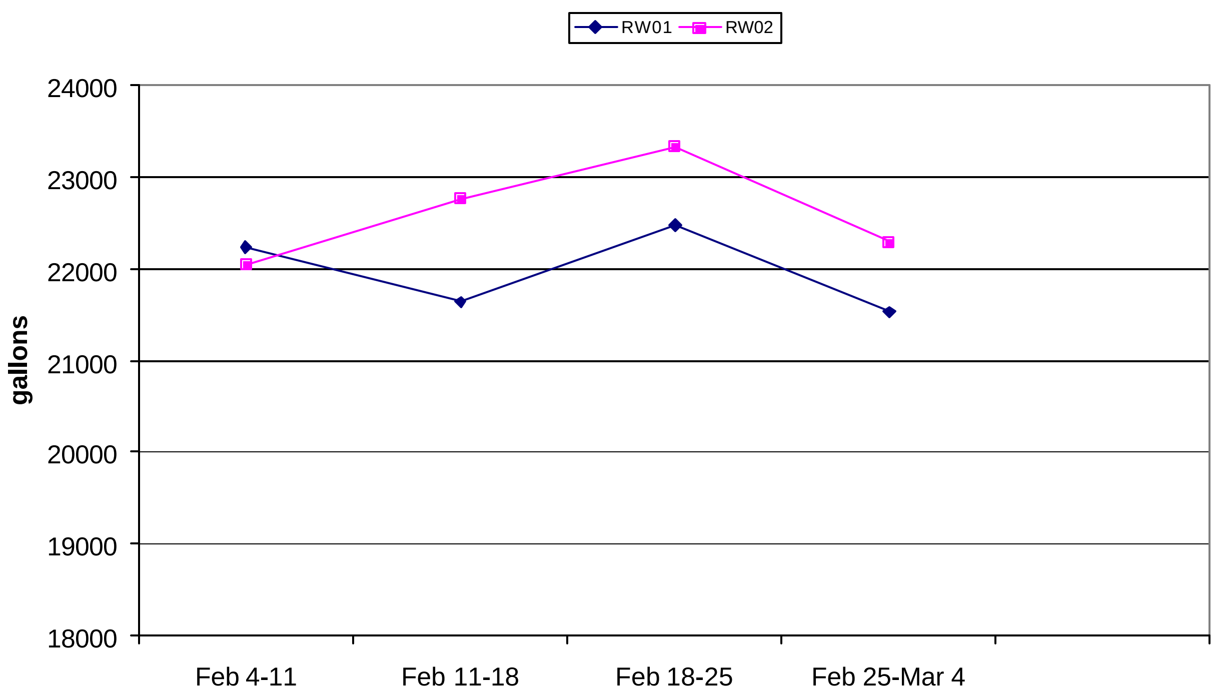

Chart 6. February 2002 Building 100 Groundwater Recovery

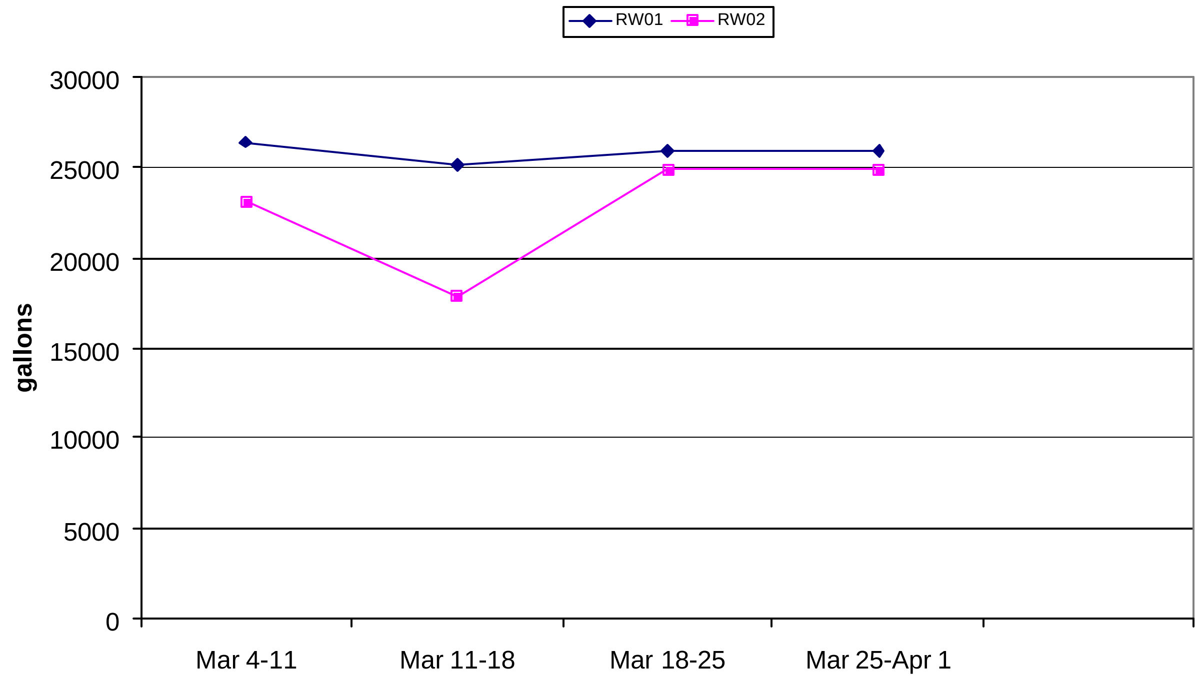

Chart 7. March 2002 Building 100 Groundwater Recovery

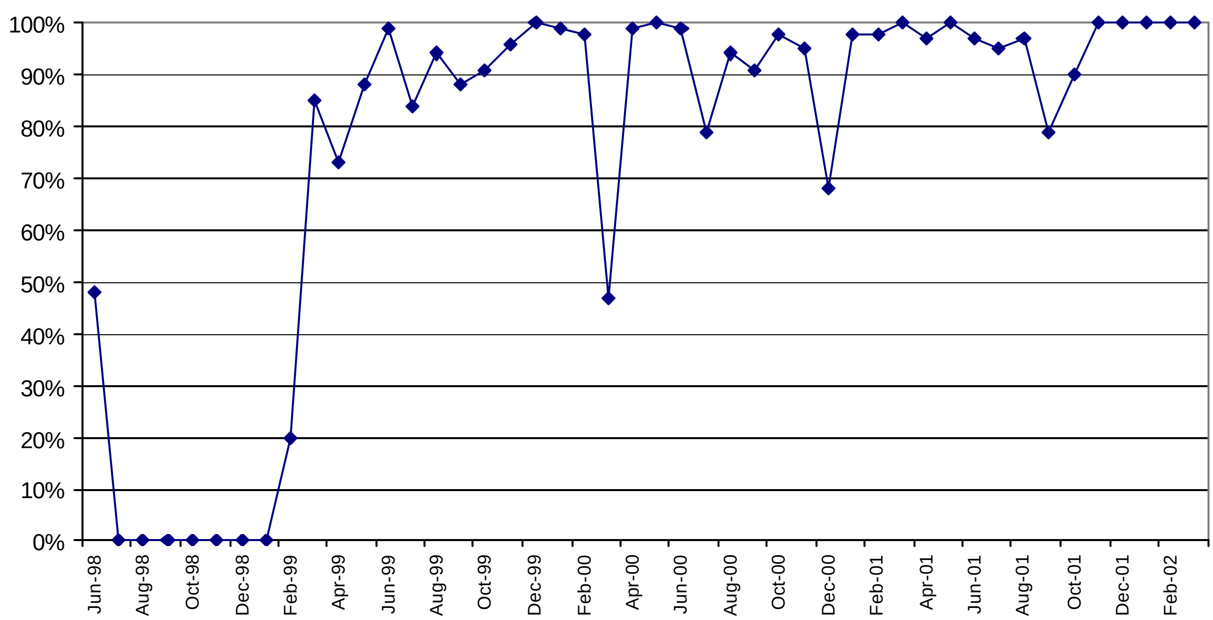

Chart 8. Historical Northeast Site Air Stripper—Percent Time On-Line

Appendix A

Laboratory Reports—January 2002 Quarterly Results

Table A–1. Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Case Number	Constituent	S[a]	D[b]	RPD Value	5 times DL[c]	Fail[d]
PIN12–0515–N001	PIN12–0583	B210221	Arsenic	0.005	0.0034	38.1	0.05	
			Barium	0.048	0.048	0.0	0.05	
			Lead	0.0027	0.004	38.8	0.025	
			m,p-Xylene	0.72	0.7	2.8	5	
PIN12–S33C–0001	PIN12–0580	B210148	Arsenic	0.01	0.01	0.0	0.05	
			Barium	0.069	0.064	7.5	0.05	
PIN12–S33C–N001	PIN12–0580	B210148	Benzene	2.1	1.6	27.0	25	
			1,1-Dichloroethane	58	45	25.2	25	
			1,1-DCE	8.5	7.4	13.8	25	
			cis-1,2-DCE	340	250	30.5	25	Fail
			trans-1,2-DCE	22	17	25.6	25	
			Methylene chloride	30	9.3	105.3	125	
			Trichloroethene	7.5	6.6	12.8	25	
			Vinyl chloride	580	420	32.0	25	Fail
			Arsenic	0.016	0.015	6.5	0.05	
			Barium	0.074	0.072	2.7	0.05	
			Mercury	0.000074	0.0001	29.9	0.001	
PIN12–S66B–N001	PIN12–0582	B210167	Arsenic	0.005	0.0041	19.8	0.05	
			Barium	0.058	0.036	46.8	0.05	Fail
			Chromium	0.005	0.0026	63.2	0.05	
			cis-1,2-DCE	0.51	0.63	21.1	5	
			Dichlorodifluoromethane	0.67	0.5	29.1	5	
			Methylene chloride	0.98	0.4	84.1	25	
			trans-1,2-DCE	0.5	0.4	22.2	5	
			Trichloroethene	0.78	0.5	43.8	5	
			Vinyl chloride	0.5	0.37	29.9	5	
PIN12–S67C–N001	PIN12–0581	B210148	1,1-Dichloroethane	62	68	9.2	50	
			1,1-DCE	5	2.4	70.3	50	
			Barium	0.06	0.061	1.7	0.05	
			cis-1,2-DCE	270	260	3.8	50	
			Lead	0.0073	0.0087	17.5	0.025	
			Mercury	0.000078	0.000074	5.3	0.001	
			Methylene chloride	18	4.9	114.4	250	
			trans-1,2-Dichloroethene	47	46	2.2	50	
			Vinyl chloride	550	480	13.6	50	
PIN15–0535–N001	PIN15–0580	B210091	Benzene	1.5	1.5	0.0	5	
			cis-1,2-DCE	0.73	0.5	37.4	5	
			Methylene chloride	2.5	1.4	56.4	25	
			o-Xylene	0.15	0.5	107.7	5	
			Toluene	1	1	0.0	5	
			Trichloroethene	0.13	0.5	117.5	5	

Table A–1. Relative Percent Difference (RPD) for Duplicate Samples

Sample ID	Duplicate ID	Case Number	Constituent	S[a]	D[b]	RPD Value	5 times DL[c]	Fail[d]
PIN15–0564–N001	PIN15–0589	B210166	hydrocarbons as diesel not detected					
PIN15–M29S	PIN15–0581	B210111	Methylene chloride	0.39	0.44	12.0	25	
PIN18–0522–N001	PIN18–0650	B210219	Arsenic	0.072	0.054	28.6	0.05	

[a]S = Original sample (N001), VOC concentrations in µg/L and metals in mg/L.
[b]D = Duplicate sample (N002), VOC concentrations in µg/L and metals in mg/L.
[c]DL = Detected limit.
[d]Fail is an RPD greater than "30% and original or duplicate result more than 5 times the detection limit. F=fail.

Appendix B

Laboratory Reports for
Northeast Site Treatment System—January to March 2002

Appendix C

Laboratory Reports for WWNA—January to March 2002

Appendix D

Northeast Site Treatment System Historical Data Table

Table D–1. Historical Summary of Groundwater Recovery at the Northeast Site and Building 100

Report Date	Quarterly (gallons)	Total To Date (gallons)
April–June 1997	356,886	356,886
July–September 1997	1,899,871	2,256,757
October–December 1997	2,265,460	4,522,217
January–March 1998	2,358,081	6,880,298
April–June 1998	1,693,697	8,573,995
July–September 1998	0	8,573,995
October–December 1998	0	8,573,995
January–March 1999	848,912	9,422,907
April–June 1999	1,985,705	11,408,612
July–September 1999	2,158,568	13,567,270
October–December 1999	2,285,471	15,852,741
January–March 2000	1,670,059	17,522,801
April–June 2000	2,031,821	19,554,622
July–September 2000	2,728,441	22,283,063
October–December 2000	2,416,705	24,699,768
January–March 2001	2,977,868	27,677,636
April–June 2001	2,452,063	30,129,699
July–September 2001	2,262,233	32,391,932
October–December 2001	2,374,065	34,765,997
January–March 2002	2,449,505	37,215,502

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